Royal School Series

THE NEW
ROYAL READERS

No. III.

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POETRY.

DIALOGUES.

POETRY FOR RECITATION.

SCHOOL SONGS WITH MUSIC.

LISTS OF WORDS CONTAINED IN THIS BOOK.

NEW ROYAL READERS.

No. III.

A FATHER'S LOVE.

1. One day a man was seen driving a horse that had become wild and excited. It plunged and reared, and at length broke away. The driver could not hold it in. So he wrapped the rein around his wrists in his efforts to hold the animal.

2. "Let him go! let him go!" cried the by-standers; "you can't hold him! Let him go! Why don't you let him go?"

3. The driver never heeded these cries; he held on with all his strength, and at last wrapped the rein around his waist.

4. Great efforts were made, and after a time the horse was caught, but not till the blood was seen to gush from the nose and mouth of the man who had tried so hard to hold it.

5. A crowd gathered around the poor man, and he was asked, "Why didn't you let him go? Your life is worth a hundred such horses."

6. "Look in the back of the waggon," said he. "Do you see that little boy? That is the only little boy we have. I could not go home to his mother

without that little boy; and for him I held the horse to the danger of my own life."

7. Ah, children, there was the father's love displayed: rather than have his little son hurt he ran a most fearful risk, but counted his own life as little worth, if he might save his boy.

New Words in this Lesson:—

blood	ex-cit'-ed	rath'-er	wag'-gon
by'-stand-ers	fear'-ful	reared	waist
dis-played'	heed'-ed	rein	wrapped
ef'-forts	plunged	risk	wrists

Questions:—1. What was seen one day? 2. What did the bystanders say? 3. What did the driver do? 4. In what state was he when the horse was caught? 5. What did the crowd ask him? 6. What answer did the man give? 7. How was the father's love displayed?

Spellings and Meanings:—

By'-stand-ers, lookers on.
Can't, cannot.
Count'-ed, valued.
Didn't, did not.
Dis-played', shown.
Don't, do not.
Ef'-forts, attempts.
Ex-cit'-ed, stirred up.
Plunged, threw its body forward and its hind legs up.
Reared, stood on its hind feet.
Rein, strap of the bridle.

Summary:—To hold a horse that was running away the driver wrapped the rein around his waist, and held on till the blood gushed from his mouth and nose. When the people asked him why he didn't let the horse go, he showed them his little boy in the waggon he was driving. He proved his love for his child by risking his own life to save his boy from danger.

Exercise:—*Write the Summary, and underline the Nouns;* as, To hold a horse that was running away the driver wrapped the rein around his waist, and

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A MOTHER'S LOVE.

1. The cold winds swept the mountain height,
And pathless was the dreary wild;
And 'mid the cheerless hours of night
A mother wandered with her child:
As through the drifting snow she pressed,
The babe was sleeping on her breast.

2. And colder still the winds did blow,
And darker hours of night came on,
And deeper grew the drifts of snow,—
Her limbs were chilled, her strength was gone.
"O God!" she cried, in accents wild,
"If *I* must perish—save my child!"

3. She stripped her mantle from her breast,
And bared her bosom to the storm,
And round the child she wrapped the vest,
And smiled to think her babe was warm.
One kiss she gave, one tear she shed,
Then sank upon the snowy bed.

4. At morn, a traveller, passing by,
Saw her beneath the fleecy veil;
The frost of death was in her eye,
Her cheek was cold, and hard, and pale:
He moved the robe from off the child—
The babe looked up and sweetly smiled!

New Words in this Lesson :—

ac'-cents	cheer'-less	flee'-cy	stripped
bared	chilled	man'-tle	swept
bô'-som	dark'-er	path'-less	trav'-el-ler
breast	deep'-er	robe	vest

Spellings and Meanings :—

Ac'-cents, tones of voice.
Chilled, made very cold.
Drear'-y, cheerless.
Drifts, heaps.
Flee'-cy, snow like wool.
'Mid, amid.
Path'-less, without a path.
Per'-ish, die.
Robe, mantle.
Swept, blew across.
Snow'-y bad, ground covered with snow.
Veil, covering.
Vest, garment.
Wild, untilled ground.

Summary :—A mother and her child were caught in a snow-storm while crossing a mountain. To keep her child warm the mother wrapped it in her own mantle. Next morning she was found dead in the snow, and her child was discovered safe and well.

Exercise :—*Write the Summary, and underline the Verbs ; as,* A mother and her child were caught in a snow-storm while crossing a mountain. To keep her

THE BIRDS' CHRISTMAS SHEAF.

1. Some time ago, writes a gentleman, I was travelling in Norway. As I passed the farm-houses I saw something of which I have often thought with pleasure since.

2. What do you think it was? A long pole was fastened on the roof of the barn at every farm-house, and on the pole was tied a little sheaf of corn. What do you think it was for?

3. For a long time I tried to guess, but I was puzzled. It seemed such a curious thing to find a sheaf tied to a pole in this way at every farm-house.

4. One day I met with a fellow-traveller. He could speak English, so I asked him the meaning of those sheaves of corn I had so often noticed.

5. He told me that they were put out at Christmas time every year, "*that the birds might have a merry Christmas.*" Each year the old sheaf is taken down and a fresh one is put up.

6. What a pretty custom, I thought. In Norway the winter is very long. There the deep snow and the hard frost last for eight or nine months of the year. The days are short, and the nights are

long and dark. The poor little birds have great difficulty in finding food.

7. But they too, like ourselves, have a little brightness at Christmas time. It must be a pretty sight to see them flocking to the Christmas feast.

8. Often since that day I have thought of the poor birds in Norway, chirping and twittering around the Christmas sheaf. What a pleasure it must be to the boys and girls there to provide this feast for their little feathered friends!

9. Boys and girls, won't you try to think of some plan like this, so that, when the season comes round again, the birds with us too may have a merry Christmas?

New Words in this Lesson:—

chirp'-ing	fast'-ened	no'-ticed	sheaf
Christ'-mas	feast	our-selves'	sheaves
cu'-ri-ous	feath'-ered	pro-vide'	trav'-el-ling
cus'-tom	mean'-ing	puz'-zled	twit'-ter-ing
Eñ'-glish	Nor'-way	sea'-son	writes

Questions:—1. What did a gentleman see in Norway? 2. What was tied on a long pole, and where was the pole placed? 3. What was the gentleman puzzled about? 4. Whom did he meet one day? 5. What did this person tell him? 6. Why did the gentleman think it was a pretty custom? 7. What is a pretty sight? 8. To whom must this Christmas feast be a pleasure? 9. What might you boys and girls do?

Spellings and Meanings:—

Chirp'-ing, making a shrill sound.
Christ'-mas, 25th Dec.
Cu'-ri-ous, strange.
Cus'-tom, way of doing; habit.
Eñ'-glish, the language of England.
Feath'-ered, covered with feathers.
Great dif'-fi-cul-ty, hard work.
Nor'-way, a country in the north of Europe.
No'-ticed, seen.
Pro-vide', make ready.
Puz'-zled, unable to tell.
Sea'-son, time of year.
Sheaf, bunch of corn.
Twit'-ter-ing, making a trembling sound.
Won't, will not.

Summary:—An English gentleman travelling in Norway says that a large sheaf of corn tied to a long pole is fastened on the roof of the barn at every farm-house in winter. The purpose of it is, "that the birds may have a merry Christmas."

Exercise:—*Write the Summary, and underline the Adjectives; as,* An English gentleman travelling in Norway says that a large sheaf of corn tied to a long pole

THE DUKE AND THE COW-BOY.

1. A Scottish nobleman, who was very fond of farming, had bought a cow from a gentleman who lived near him. The cow was to be sent home next morning. Early in the morning, as the duke was taking a walk, he saw a boy trying in vain to drive the cow to his house. The cow was very unruly, and the poor boy could not manage her at all.

2. The boy, not knowing the duke, called out to him, "Hallo, man! come here and help me with this beast." The duke walked slowly on, not seeming to notice the boy, who still kept calling for his help. At last, finding that he could not get on with the cow he cried out in distress, "Come here, man,

and help me, and I'll give you half of whatever I get."

The duke went, and lent a helping hand.

3. "And now," said the duke, as they walked along after the cow, "how much do you think you will get for the job?"

"I don't know," said the boy; "but I am sure of something, for the folk up at the big house are good to everybody."

4. On coming to a lane near the house, the duke slipped away from the boy, and reached home by a different road. Calling a servant, he put a sovereign into his hand, saying, "Give that to the boy who brought the cow."

He then returned to the end of the lane, where he had parted from the boy, so as to meet him on his way back.

5. "Well, how much did you get?" asked the duke.

"A shilling," said the boy; "and there's half of it to you."

"But surely you got more than a shilling?" said the duke.

"No," said the boy; "that is all I got; and I think it quite enough."

6. "I do not," said the duke; "there must be something wrong; and as I am a friend of the duke, if you return I think I can get you more."

They went back. The duke rang the bell, and ordered all the servants to be assembled.

"Now," said the duke to the boy, "point out the person who gave you the shilling."

"That man there," said he, pointing to the butler

7. The butler fell on his knees, confessed his fault, and begged to be forgiven; but the duke ordered him to give the boy the sovereign, and quit his house at once. "You have lost," said the duke, "both your place and your good name by your deceit. Learn for the future that honesty is the best policy."

8. The boy now found out who it was that had helped him to drive the cow; and the duke was so pleased with the manliness and honesty of the boy, that he sent him to school, and paid for him out of his own pocket.

New Words in this Lesson:—

as-sem'-bled	duke	hon'-es-ty	pol'-i-cy
but'-ler	farm'-ing	man'-age	Scot'-tish
con-fessed'	for-giv'-en	man'-li-ness	shil'-ling
de-ceit'	fu'-ture	no'-ble-man	sov'-er-eign
dif'-fer-ent	hal-lo'	or'-dered	un-ru'-ly

Questions:—1. What did the duke see? 2. What offer did the boy make to the duke? 3. Why did the boy expect to get something? 4. What did the duke do when they came near the house? 5. How much did the boy say that he had got? 6. What did the duke then do? 7. What did the butler do when he saw that he was found out? How was he punished? 8. What did the duke do for the boy?

Spellings and Meanings:—

As-sem'-bled, brought together.
But'-ler, man-servant.
Con-fessed', owned; said.
De-ceit', cunning.
Duke, a nobleman of high rank.
Fu'-ture, time to come.
Hon'-es-ty, the proper use of another's goods.
I'll, I will.
Man'-li-ness, man-like ways.
No'-ble-man, man of rank.
Pol'-i-cy, rule to act by.
Sov'-er-eign (*suv'-er-in*), a gold coin, worth twenty shillings.
Un-ru'-ly, wild; not easily led.

Summary:—A boy, who was driving a cow to a duke's house, met the duke by the way, and, not knowing who he was, promised to give him half of what he received if he would help him. When they arrived, the duke left the boy, and sent him a sovereign; but, on again joining him, he found that the boy had only a shilling. The butler, who had kept the sovereign, was dismissed.

Exercise:—*Write the Summary, and underline the Pronouns;* as, A boy who was driving a cow to a duke's house, met the duke by the way, and, not

THE HABIT OF NEATNESS.

Charles. It seems to me, John, that you think yourself rather smart this morning. How your shoes shine! I hope you are not getting so proud that you will not speak to a fellow like me.

John. Why, what do you mean, Charles? Don't you think I can have my shoes brushed without being proud?

Charles. Oh, yes, I hope you can; but what is the use of being so very nice? I should think you had never seen any dirt. For my part, I don't care if my shoes have mud on them. I'm not afraid of dirt, I can tell you.

John. Nor am I afraid of it; but I think it is our duty to keep ourselves neat and tidy. Would you like to see all the scholars come to school with muddy shoes, so that the floor would always be covered with dirt and dust? Our teacher likes to have the school-room neat and clean; and I think he is right, and I for one will do my part to please him.

Charles. I, too, am willing to please my teacher; but what is the use of being so very particular, I'd like to know?

John. I think it is a good thing to be neat and clean. My mother says I can save her much work by being careful about my shoes and clothes; and if I can, I am sure I ought. Now, tell me, Charles, do not you like to see boys neat? There's Tom Careless, always covered with mud; and his face is never clean, nor his hair brushed. Would you like to sit beside him all day?

Charles. Why, no, I can't say that I should, when it comes to that. I think, after all, that you are right, John; and I will try to be more careful myself, though I fear I shall never be so neat as you are.

John. Oh, yes, you will, Charles. Once form the habit of neatness, and it will be much easier, as well as pleasanter, to be clean than to be covered with mud.

New Words in this Lesson:–

ea'-si-er neat'-ness ought par-tic'-u-lar pleas'-ant-er

Questions:—Why did Charles say that John thought himself to be smart? What was John's reply? What did Charles say that he was not afraid of? What reasons did John give for going to school neat and tidy? What did Charles say that he was willing to do? What could John do by being neat and clean? What boy was always dirty and untidy? What did Charles say that he would do? What will make it easy to be neat and clean?

Spellings and Meanings:–

Don't, do not.
Form, make.
Hab'-it, custom; way of doing.
I'd, I should.
I'm, I am.
Neat, nice and clean.
Our du'-ty, doing what is right.
Par-tic'-u-lar, careful.
Proud, stuck up.

Summary:—When Charles saw how brightly John's shoes shone, he thought that John was getting proud. What Charles called pride was only neatness. The habit of neatness is shown by always keeping our bodies and our clothes quite free from dirt, and also by being careful with our clothes, and keeping them tidy.

Exercise:—*Write the Summary, and underline the Adverbs*: as, When Charles saw how brightly John's shoes shone, he thought that John was getting proud.

THE TEA FARMER.

1. Once upon a time there was no tea at all in our country. In England, in the olden time, people used to drink ale, and a sweet kind of wine called mead. Great tankards of ale stood on the breakfast table. Now we use tea and coffee.

2. When tea was first brought to England, an old man and woman had some sent to them as a great treat. But when they got it, they did not know how it ought to be used. At length they boiled the leaves, and strewed them on a piece of bacon which they were going to have for dinner. They ate the leaves, and threw away the tea!

3. In those days, a pound of tea cost so much money that only the rich could buy it. Now it is so cheap that even the poorest may enjoy it.

4. Tea is the leaf of a plant which grows plentifully in China, Japan, and other Eastern lands. The Chinese drink their tea without either milk or sugar. Whenever a visitor enters a house, a servant always brings him a cup of tea.

5. Every cottager in China has his little tea-garden. He sells what he does not use, and can thus buy food and clothing for his family.

6. When a man has a large piece of ground, and grows a great many tea-plants, he is called a tea farmer. When the tea-leaves are ready to be gathered, the farmer and his family are very busy. They pull off the leaves and throw them into baskets. When the baskets are full, they are carried into the house.

7. The leaves are dried in iron pans over a fire. While they are drying, men and women keep turning them about. As soon as they begin to curl, they are taken out and spread upon a table. Then the work-people roll them up in their hands, and press all the juice they can out of them.

8. After being dried in the air, the leaves have

to go once more into the pan over the fire. There they begin to curl and twist; and at last they look as we see them in this country.

9. The tea farmer then picks out the best leaves, and gets them ready for market. He may then be seen marching off to the town, with his chest of tea slung over his shoulder, on a pole made of bamboo.

10. He goes to a tea merchant and offers the chest of tea for sale. The merchant looks at it, and if he thinks it good he buys it. Then the farmer marches home again, with his money slung over his shoulder. His money consists of a number of strings of brass coins, of so little value that a great many of them make but a small sum.

New Words in this Lesson:—

bam-boo′	con-sists′	mead	strewed
break′-fast	cot′-tag-er	mer′-chant	tank′-ards
Chi′-na	East′-ern	old′-en	twist
Chi-nese′	Ja-pan′	plen′-ti-ful-ly	val′-ue
coins	juice	poor′-est	vis′-i-tor

Questions:—1. What was used in England for breakfast before tea and coffee were known? 2. What mistake did an old man and woman make when tea was first known? 3. What change has taken place in the price of tea? 4. What is tea? Where does it come from? 5. What has every cottager in China? 6. What is a man called who grows a great many tea plants? 7. What is done with the leaves when they are pulled? 8. What next? and next? 9. How does the grower carry his tea to market? 10. What does he bring back?

Spellings and Meanings:—

Ba′-con, salted pork.
Bam-boo′, the stem of a tall strong reed
Cheap, of little value
Chi′-na, a country of Asia
Chi-nese′, people of China.
Coins, pieces of stamped metal
Con-sists′, is made up of
Cot′-tag-er, dweller in a cottage
Ja-pan′, a country of Asia
Mer′-chant, one who buys and sells
Old′-en, far back
Pound, sixteen ounces
Tank′-ard, a large drinking-can
Val′-ue, worth

Summary:—When tea was first brought to England it was so dear that only the rich could buy it. Tea grows in China, Japan, and other Eastern lands. A man who has a great many tea plants is called a tea farmer.

Exercise:—*Write twenty Proper Names in use, as* **England, China, Japan, Alfred, Jane.** *Begin each word with a capital letter.*

THE LITTLE RAILROAD HERO.

1. Andy Moore was a little country boy. Sometimes he wore a cap, and sometimes he did not: he perhaps thought his shaggy hair was a good enough covering for his head.

2. He did not care at all about his looks. He knew a great deal more about squirrels and birds'-nests than he did about the fashions.

3. Andy's home was a rough house on the side of a hill. It was built of mud and logs, with holes for windows.

4. Now perhaps you may wonder how we are going to find a little hero in a poor country boy, living in a mud house. But wait a little: the diamond is a coarse, dull stone, till it is cut and polished; and there was the heart of a true hero under Andy's torn jacket.

5. Near the hut of Andy's father was a railroad. The boy often watched the black engines as they came puffing past, giving out great clouds of steam and smoke, and screeching through the valleys and under the hills like mad things.

6. One day, as Andy was crossing the line, he saw that there was something wrong. He did not know much about railroads, for he was very young. But something was surely wrong; and Andy had heard of carriages being thrown off when the rails were out of place.

7. Just then he heard a low, distant noise. A train was coming! He was only a boy, but perhaps he could stop the train in some way. He felt that he must try, for there was nobody else to do it.

8. Andy never thought that he might be killed; but went and stood right in the middle of the line, just in front of the place I have told you about, and stretched out his little arms as far apart as he could!

9. On, on came the train, nearer and nearer, and louder and louder. The driver saw the boy on the line, and whistled for him to get out of the way. Andy did not stir an inch.

10. Again the engine whistled. The boy never

moved; he might have been made of stone for all the notice he took of it. So the driver had to stop the train.

11. He jumped down from the engine, and ran along the track toward Andy. The train was late, and the driver was angry. But when he saw how the brave little fellow had saved his life and the lives of all the people in the carriages, his anger changed to gladness.

12. Everybody got out of the train to see what was the matter. Then they saw that if Andy had not stopped the train, the carriages would have

been thrown down a steep bank and dashed in pieces.

13. The ladies kissed Andy's rough, freckled face, and cried over him; and the gentlemen, as they looked at their wives and children, wiped their eyes and said, "God bless the boy!"

14. And that is not all: they took out their purses, and made up a large sum of money for him. Not to pay him for what he had done—they knew they never could do that—but to show the little lad, better than words could show him, how grateful they felt to him.

15. Good, brave little Andy! The passengers all wrote down his name—*Andy Moore*—and the place where he lived.

16. Fifteen years have passed since Andy's brave deed and if you wish to know where he is now I will tell you. He is a driver on this very railroad, and the coolness, the courage, the presence of mind of the boy, mark the man.

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car'-riag-es	en'-gines	no'-bod-y	rail'-road
cool'-ness	fash'-ions	pas'-sen-gers	screech'-ing
cour'-age	fif'-teen	pol'-ished	smoke
cross'-ing	freck'-led	pres'-ence	steam
dis'-tant	he'-ro	puff'-ing	whis'-tled

Questions:—1. Who was Andy Moore? 2. What did he know about? 3. Where was his home? 4. What was there under Andy's torn jacket? 5. What ran past Andy's father's hut? 6. What did Andy see one day? 7. What did he hear? 8. What did he do? 9. What did the driver see? 10. What might Andy have been? 11. What did the driver see when he came to Andy? 12. What would have happened had not Andy stopped the train? 13. What did the ladies do? What did the gentlemen do? 14. How did they show their gratitude? 15. What did the passengers write down? 16. How long is it since this happened? What is Andy doing now? What kind of a man is he?

Spellings and Meanings:—

Cour-age, bravery: without fear.
Di-a-mond, precious stone.
Dis-tant, far off.
Driv-er, man in charge of the engine.
Fash-ions, styles of dresses.
Freck-led, spotted.
Grate-ful, thankful.
He-ro, brave person.
Pas-sen-gers, persons travelling by the train.
Pres-ence of mind, ready thought.
Rail-road, road on which rails are laid.
Screech-ing, making a shrill sound.
Steep, straight down.
Track, rail-road.
Val-leys, hollows.

Summary:—Andy Moore lived in the country by the side of a railway. One day when crossing the line, he saw the rails were out of place. Hearing a train coming, he stood in the middle of the line, the driver stopped the train, and the people were saved. Andy is now an engine driver on the same railroad.

Exercise:—*Write twenty Common Nouns*, as, **country, railway, day, line, rails, train, people.**

THE THREE SIEVES.

Child. O mother! do hear what a tale I've heard;
So bad I can scarce believe—
Mother. Stop, stop, my child! not a single word,
Till we sift it through the sieve.

Child. "The sieve?" The meaning of what you've said
I certainly do not know.
Mother. The *Sieve of Truth:* through its *golden* thread
Are you sure the story will go?

Child. No, not quite sure. But you must believe;
It is told all over town—
Mother. Stop, stop, my child! through another sieve
Let us sift this matter down.

Child. "Another sieve?" What can it be?
You certainly make me laugh!
Mother. The *silver* sieve, *Is it kind?* Let's see,
If it leaves us grain or chaff.

Child. No, not quite kind. But cannot I
Tell my mother the worst or best?—
Mother. Stop, stop! by the *iron* sieve we'll try
Once more, as a final test.

Child. And what is the iron sieve? full well
Its test I should like to know.
Mother. It is this, my child: *Is there need to tell?*
If not, let the story go.

Child. *It is needless to tell; it may not be true;*
And I'm sure *it is not kind.*
Mother. Then I'd let it go, if I were you,
Like the chaff before the wind.

New Words in this Lesson—

fi-nal needless sieve sift test

Spellings and Meanings—

Chaff, [illegible]
Fi-nal, last.
I've, I have.
Let's, let us.
Need-less, not required.
Reason, [illegible]
Sieve, [illegible]
Sift it, pass it through.
Test, trial.
We'll, we will.
You've, you have.

Summary—A child was about to tell her mother a tale that she had heard. But her mother would not hear a word till the story had been passed through the golden sieve of truth, the silver sieve of kindness, and the iron sieve of necessity. The child said, "It is needless to tell; it may not be true. It is not kind." Then said the mother, "I'd let it go, like the chaff before the wind."

THE SNAIL ON THE WALL; OR, NEVER GIVE UP.

1. "What ails you, lad?" said Dame Bell to a little boy who sat near a wall at the back of her house. He had a book in his hand, and tears were in his eyes.

2. "We have all got a poem called *Little Jim* to learn," said the boy, whose name was Tom Blair; "and the one who says it best is to get a prize from the master. But I don't think I can learn it."

3. "Why not?" said the dame.

"The boys say that I can't, and that I need not try," said Tom in a sad tone.

"Don't mind what the boys say. Let them see that you can learn it," said his friend.

4. "But I don't think I can," said Tom; "it is so long, and some of the words are so hard. I know I need not try for the prize. But I should like to learn the poem as well as I can; for the boys laugh at me, and call me 'Slow Tom.'"

5. "Well, dear," said the dame, in a kind voice, "if you are slow, and can't help it, try to be 'slow and sure,' as they say. Look at that snail on the wall; how slow it is! And yet, if you watch it, you will see that it will get to the top in time.

6. "So just try to learn a few lines each day, and you may gain the prize in the end. And when you are like to lose heart, think of the snail on the wall."

7. When Dame Bell had said that, she went on her way. And Tom thought that, though he could not keep up with the boys, he might run a race with the snail. So he resolved to try to learn his task by the time the snail got to the top of the wall.

8. At last the day came on which the master was to give the prize, and he called up the boys to repeat the poem. When five or six had recited, it came to Tom's turn.

9. There was a laugh when he got up; for most of the boys thought that he would fail. But he did not miss a word; and his heart was full of joy when the master said, "Well done, Tom Blair!"

10. When the rest of the class had tried, the master said Tom had done best; and he gave him the prize.

"And now tell me," said the master, "how you learned the poem so well."

"Please, sir, it was the snail on the wall that taught me how to do it," said Tom.

11. There was a loud laugh when Tom said this. But the master said, "You need not laugh, boys; for we may learn much from such things as snails. —How did the snail teach you, Tom?"

12. "Please, sir, I saw it crawl up the wall bit by bit. It did not stop, nor turn back, but went on and on. And I thought I would do the same with my task. So I learned it bit by bit, and did

not give up. And by the time the snail had got to the top of the wall, I had learned it all."

13. "Well done, Tom!" said the master.—"Now, boys, let us give a good cheer for Tom Blair and the snail on the wall." And the old house rang with a loud, long cheer. For all were glad that "Slow Tom" had got a prize at last.

New Words in this Lesson:—

Blair po'-em re-cit'-ed re-peat' re-solved'

Questions:—1. Why did Dame Bell speak to Tom? 2. What had the boys got to do? 3. Why did Tom think that he could not learn the poem? 4. Who did he wish to learn it? 5. What did Dame Bell tell Tom to do? 6. What did she tell him to do? 7. What did Tom then make up his mind to do? 8, 9 How did Tom say the poem? 10. Who got the prize? 11. What was there a long laugh? 12. How did the small birds greet Tom? 13. Why did the boys at last give a loud cheer?

Spellings and Meanings:—

Ails, is wrong with.
Can't, can not.
Dame, an old woman.
Don't, do not.
Fail, be unable to say it.
Gain, win.
Learn, get by heart. [can't.
Learn heart, [you
Mind, take your notice of
Po'-em, a piece of poetry.
Prize, reward.
Re-cit'-ed, repeated aloud.
Re-peat', say over
Re-solved', made up his mind.
So hard, not able to learn
Task, lesson, this poem
Tone, sound of voice

Summary:—A teacher promised to give a prize to the boy who should best say a poem called *Little Jim*. Tom thought he could not win the prize because the boys said he was slow. Dame Bell found him with a book in his hand and tears in his eyes. She told him that if he were slow and sure like the snail on the wall, he might win the prize. He tried, and won it. All were glad that "Slow Tom" had got a prize at last.

Exercise:—*What is a Proper Noun? What is a Common Noun? Give twenty of each, including those in the Summary.*

STORIES OF DOGS.

1. In a town in the south of France, twenty poor people were served with dinner, at a certain hour every day. A dog belonging to the place was always present, at this meal, to watch for the scraps that were now and then thrown to him.

2. The guests, however, were poor and hungry, and of course not very liberal. So the poor dog hardly did more than smell the feast, of which he would have liked a share.

3. Now it happened that this dinner was served out to each one on his ringing a bell; but, as the person who served the dinner handed it through a small opening, he did not see who received it.

4. Well, one day the dog had waited till all the poor people were gone. Having himself got very little to eat, he reached up, took hold of the rope with his teeth, and rang the bell. A good dinner was at once handed out, and the dog ate it with great delight.

5. This was done by the dog for several days;

but the rogue was at length found out. It was thought, however, so clever for a dog that he was allowed to take his regular turn at the dinner every day. And thus he went on for a long time, ringing the bell, and taking his meal with the poor!

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6. One dark night, the watchmen at a small village on one of our coasts heard the whining of a dog. They went out to the dog, and having tied a lantern to his neck, they followed him to the beach.

7. There they found a woman and her child, a little girl two years old, stretched on the sand, and, as it seemed to them, all but dead.

8. They carried them to a house about half a mile off, and used means to revive them. The child was nearly quite well next morning, but the mother came round very slowly.

9. After a few days, however, she was able to speak. The first thing she said was, "Where is Robert — where is my husband?" And very bitterly she wept as she thought that she should never see her dear husband more.

10. She had sailed with him, some weeks before, in his ship the *Merry May*. They had met with one storm after another; and at last the ship had been driven on the rocks and wrecked.

11. The only thing the good lady could remember, after the breaking up of the ship, was that she had been dragged ashore by some one, while she held her child firmly clasped in her arms.

12. It was their faithful dog that had saved them from drowning, and that had brought to

their help the good watchmen who had treated them so kindly.

13. What was her joy when she found, a day or two later, that her husband also was safe! He had floated on a spar all night, and had been picked up in the early morning by a passing ship.

14. Great was the joy of the meeting of father, mother, and child; and deeply thankful they were to God for his mercy. Nor did they ever forget how much they owed to their noble dog. As soon as they reached their own home the captain had a new collar made for him, on which the story of his brave act was told.

New Words in this Lesson:—

al-lowed′	clasped	how-ev′-er	reg′-u-lar
a-shore′	col′-lar	lib′-er-al	re-vive′
be-long′-ing	firm′-ly	meet′-ing	rogue
bit′-ter-ly	float′-ed	mer′-cy	watch′-men
break′-ing	guests	owed	whin′-ing

Questions.—1. What was done in a town in the north of France? 2. What fell on the dog? 3. What was the dinner-service? 4. What did the dog do? 5. How was he rewarded? 6. What did watchmen hear? 7. What was found on the beach? 8. Where did they take those persons? 9. What was the first thing the woman said? 10. What had happened to them? 11. What was the last thing she remembered? 12. How had they been saved? 13. How was her husband saved? 14. What did they never forget?

Spellings and Meanings:—

Act, deed, thing done.
Allowed′, let.
France, a country of Europe.
Guests, visitors.
Lib′-er-al, free in giving.
Owed, had to thank.
Reg′-u-lar, every day.
Re-vive′, restore.
Rogue, cheating animal.
Watch′-men, men of the night.
Whin′-ing, low, broken cries.
Wrecked, broken to pieces.

Summary.—A dog, in a town in the north of France, saw that each person who rang a bell was served with a dinner. So he rang the bell, and also produced a good dinner. When found out he was thought to be an clever that he was allowed to go on doing so for a long time. A night, the *Merry May*, a ship... The captain's wife and child are dragged ashore by the dog. The dog gets a new collar, bearing the story of his brave act.

Exercise.—Make a list of the Nouns in the Summary, and say whether they are of the Masculine, Feminine, Common, or Neuter gender, as, **husband**, masculine; **wife**, feminine; **person**, common; **France**, neuter.

GRANDPAPA.

1. Grandpapa's hair is very white,
And grandpapa walks but slow;
He likes to sit still in his easy chair
While the children come and go.
"Hush!—play quietly," says mamma;
"Let nobody trouble dear grandpapa."

2. Grandpapa's hand is thin and weak.
It has worked hard all his days;
A strong right hand, and an honest hand,
That has won all good men's praise.
"Kiss it tenderly," says mamma;
"Let every one honour grandpapa."

3. Grandpapa's eyes are growing dim
They have looked on sorrow and death;
But the love-light never went out of them,
Nor the courage and the faith.
"You, children, all of you," says mamma,
"Have need to look up to dear grandpapa."

4. Grandpapa's years are wearing few
But he leaves a blessing behind;
A good life lived, and a good fight fought,
True heart, and equal mind.
"Remember, my children," says mamma,
"You bear the name of your grandpapa."

Miss Mulock.

[illegible] in this Lesson:—

bless-ing	fought	mam-ma'	troub-le
e-qual	grand-pa-pa'	ten-der-ly	wear-ing

[illegible] and Meanings:—

[illegible]-age, [illegible]
[illegible]
Faith, [illegible]

Grand-pa-pa', father's or [illegible]
Love-light, [illegible]

Ten-der-ly, kindly
Wear-ing few, growing fewer

Summary.—[illegible] and [illegible] children to play [illegible] [illegible] also [illegible] to [illegible] and [illegible] that he has done his duty and brought [illegible] to the name they bear.

Exercise.—Write twenty Nouns of the Masculine Gender; as, **grandpapa**.

THE BOOK OF THANKS.

Albert. I feel so vexed and out of temper with Ben that I really must—

Cousin Clara. Do something to injure him?

Albert. Oh no; that is not what I was going to say, but that I must look over my "book of thanks."

Clara. Book of thanks! what sort of a book is that, I should like to know?

Albert. Here it is (taking a small book from his pocket). Shall I read from it?

Clara. Do, please.

Albert. "June 8th. Ben lent me his new bat."

"When I lost my shilling, Ben found it for me."—"June 30th. Ben invited me to go and have some cherries in his father's garden." So, after all, Ben is a good kind boy.

Clara. Why, Albert, what do you write in your book?

Albert. All the acts of kindness that are ever shown me. And you would wonder how many they are! I find much good from writing them down—I do not forget them, as I might do if I trusted to my memory; so I hope I am not often ungrateful. And when I am vexed or out of temper, I almost always feel pleasant again if I only look over my book.

Clara. I should like to see what sort of things you put down. Will you let me see the book, Albert?

Albert. Certainly, Clara. (Passing the book.)

Clara. (Takes it, and reads.) "Henry kindly asked me to spend a day with him, and did all he could to make my visit pleasant." "Mrs. Day gave me some nice plums." "Fred Churchill asked after me every day when I was sick, and came to see me when I was getting better." And I see you put "father and mother" at the *top* of every page; why is that, Albert?

Albert. Oh, they are so good to me, and do so much for me, that I cannot put it all down, and so I just write their names, to remind me of their constant care and goodness. I know that I can never repay them. Read what I have put at the beginning of the book.

Clara. (Reads.) "Every good gift is from above."

Albert. That is to remind me that I owe thanks to God for all the blessings I enjoy.

Clara. Well, Albert, I must say that I like your book very much. I must ask mother to get a blank book for me, and then I too will keep a "book of thanks."

New Words in this Lesson —

Al-bert	Cla-ra	mem-o-ry	tem-per
be-gin-ning	con-stant	pleas-ant	un-grate-ful
blank	in-jure	re-al-ly	vexed
Church-ill	in-vit-ed	re-mind'	writ-ing

Questions — How did Albert feel towards Ben? What did Clara think that he was going to do? What was he about to do? What did Clara ask? Where was the book? What did Albert read out of it? Why did Albert write these things? What other things did Clara read in Albert's book? Why did he put "father and mother" at the top of every page? What had he written on the first page of his book? What did Clara say that she would do?

Spellings and Meanings —

Blank book, book to write in.
Con-stant, daily (write in.
In-jure, harm.
In-vit-ed, asked (member
Mem-o-ry, power to re-
Re-mind', keep in mind.
Re-pay', pay back.
Un-grate-ful, unthankful
Vexed, troubled.

Summary — Albert had a "book of thanks," in which he put down all the acts of kindness shown to him. On the first page he wrote, "Every good gift is from above," and at the top of every page he put "father and mother." When any one made him angry he looked over his book of thanks, and that made him feel pleasant again.

Exercise — Write twenty *Names of the Persons* (nouns), as, **mother.**

LITTLE ROBERT, THE TRAPPER.

1. One morning while the pitmen were at work in a coal mine, they heard a noise louder than thunder. In a moment every lamp was out, and men and boys threw down their tools and ran.

2. It is Tuesday morning. The men reach the bottom of the shaft, and count their number. Five are missing, four men and one little trapper,* Robert Lester. People above hear the noise, and rush to the pit mouth. The workmen are taken up. Oh the agony of the wives and mothers of those who are left behind!

3. Brave men go back to their rescue. When they reach the spot they find nothing but a heap of ruins. They shout, but there is no answer. Up go pick-axes and shovels, to clear the way. It is great labour, and it involves great risk.* Men flock from all quarters to offer their help. How they work!

* The business of the trappers is to sit at the trap-doors which lead out of the passages of the mine, and to open and shut them as required. Often little boys are employed at this. It is not hard, but it is very dismal and tiresome work.

4. Towards night they hear something. It is not a voice, but a tapping. It can just be heard. *Clink, clink, clink, clink, clink!* five times, and then it stopped. Clink, clink, five times again, and then it stopped. Five more, and then a stop.

5. What does it mean? One man guessed. There were five missing, and the five clinks showed that all the five were alive, waiting for deliverance. A shout of joy went up from the pit.

6. How does it fare with the poor prisoners? They were frightened like the rest by that sudden and awful noise. Little Robert left his door and ran to the men, who well knew what it meant. Waiting till everything was quiet, they went forward to examine the passage-way Robert had left. It was blocked up. They tried another; that also was blocked up. Oh, fearful thought—they were *buried alive!*

7. The men went back to the boy. "I want to go home; please do let me go home," said little Robert. "Yes, yes, as soon as we find a way out, my little man," said Truman, in a kind yet husky voice. The air grew close and suffocating, and they took their oil-cans and food-bags to one of the galleries where it was better.

8. Truman and Logan, two of the buried hewers, were religious men. "Well, James, what shall we do next?" asked Truman.

"There is but one thing we can do," said Logan. "God says, 'Call upon me in the day of trouble: I will deliver thee.'"

9. They all knelt down. Poor little Robert cried

bitterly. But as the two pitmen prayed,—first the one and then the other,—the hearts of all grew lighter, and even the little trapper dried his tears.

10. They then got their pick-axes; but what a hopeless task it seemed, to cut through that terrible mass of earth and stones to daylight! Their hearts beat with hope and joy when they first heard the sound of their friends working on the other side. It was then that they made the *dead, blind*, with their pick-axes, which was heard by their deliverers, and so much encouraged them in their work.

11. Wednesday, Thursday, Friday passed, and no rescue. What dark and dreadful days! Worse than all, the sounds beyond did not seem to draw nearer. At last Saturday came. This was the fifth day; and the men outside knew that there was not a moment to lose. They were too anxious even to speak. It was only work, work, work, for dear life. For hours they had heard no knocks. Were their poor comrades dead?

12. Suddenly the wall was pierced, a hole was made through it; feeble voices were heard.

"*Truman, are you there?*"—"Yes; all here."

"*All living?*"—"Yes, thank God, all living."

"All living! all living!" shouted the men; and the shout went up to the mouth of the pit. When Robert's father heard that his son was alive, the good news was too much for him, and he fell down senseless.

13. One hour more and the rescuers reached their comrades. Who can describe the meeting; or the joy and gratitude of wives, mothers, and friends, as one and another were brought up to the light? What a cry of joy rent the air as Mr. Lester with Robert in his arms came in sight "Safe! safe! God be praised!"

New Words in this Lesson:—

ag'-o-ny	ex-am'-ine	Lo'-gan	res'-cu-ers
com'-rades	gal'-ler-ies	miss'-ing	sense'-less
de-liv'-er	grat'-i-tude	pick'-ax-es	shaft
de-liv'-er-ance	hew'-ers	pit'-men	suf'-fo-cat-ing
de-liv'-er-ers	in-volves'	re-lig'-ious	trap'-per
en-cour'-aged	Les'-ter	res'-cue	Tru'-man

Questions.—1. What noise was heard one morning in a coal mine? 2. How many [illegible] were [illegible]? 3. [illegible] did the men who had escaped do? 4. What noise did they hear towards night? 5. What did it mean? 6. What fearful fact did the prisoners discover? 7. In what state was the air? 8. What did Logan say that they could do? 9. What did they do? 10. How did they try to effect their escape? 11. How many days passed? 12. What shout went up from the pit? 13. How were the rescued persons received?

Spellings and Meanings:—

Ag'-o-ny, pain of mind.
De-liv'-er-ance, some one to dig them out.
En-cour'-aged, gave heartening.
Gal'-ler-ies, passages.
Grat'-i-tude, thankfulness.
Hew'-ers, workers in a mine.
Husk'-y, thick.
In-volves', has in it.
Pierced, cut through.
Re-lig'-ious, God-fearing.
Res'-cue, save.
Res'-cu-ers, men who were trying to save their fellows.
Ru'-ins, destroyed things.
Sense'-less, as if dead.
Shaft, opening leading to the mine.
Suf'-fo-cat-ing, hard to breathe.

Summary.—An explosion in a coal mine blocked up the passages with earth and stones. Four men and a boy were shut in. The boy was a trapper: his work was to sit at one of the trap-doors of the mine and open and shut it as required. Their comrades began at once to clear a way for them. On the fifth day they were all taken out alive.

Exercise.—Write twenty Nouns of the Common Gender; as, **person, bird, child, infant.**

THE SAILOR AND THE DOG.

1. Once a vessel was out on the wide ocean, when a raft was seen at a distance floating on the waves. The captain of the ship gave orders to his men to

steer in that direction, as he thought that there might be some shipwrecked persons on the raft. Nearer and nearer they came to it, till at last they could see a dog, and what appeared to be a man. A boat was then lowered from the vessel, and some of the sailors rowed quickly to the raft.

2. A young sailor and a dog were its only occupants. The sailor was found lying senseless and exhausted on the raft, while his faithful dog stood over him and tried to rouse him from his stupor. He was lifted into the boat, and the dog leaped in after him, barking with joy at their deliverance. The sailors quickly rowed back to the ship, and the poor shipwrecked lad, under the kind care of the captain, soon recovered.

3. He told them that, a week before, the ship he was in had sprung a leak, and that he alone of all the crew had been saved. For days and nights he had been drifting about on the wide ocean, with none beside him but his faithful dog.

4. The dreary night had passed away,
The dawn was in the skies,
But senseless on his heaving raft
The shipwrecked sailor lies.

5. Yet, sleepless, watchful, faithful friend,
His dog is striving there
To rouse the sailor from his swoon,
To bid him not despair.

6. The dog has seen the distant sail
Across the rolling seas;
The dog's loud eager bark for help
Is borne upon the breeze.

7. And nearer, nearer comes the ship,
And gallant tars prepare
To launch the boat to reach the raft—
Oh, who would now despair!

8. Saved! saved they are! oh, blessed day
The dog and shipwrecked boy,
Companions once in sufferings,
Companions now in joy.

9. The sailor lived to tell at home
How God had heard his prayer,
And sent in mercy help to him
When all was deep despair.

10. Learn, then, even in the darkest hour,
To trust the Almighty's care;
His eye beholds, his hand protects—
Oh, who would then despair!

New Words in this Lesson:—

Al-might'-y	leak	re-cov'-ered	stu'-por
ea'-ger	low'-ered	rouse	suf'-fer-ings
ex-haust'-ed	oc'-cu-pants	rowed	swoon
gal'-lant	pray'-er	ship'-wrecked	tars
heav'-ing	raft	striv'-ing	ves'-sel

Questions: -1. What was seen out on the wide ocean? What did those in the ship do? 2. What was found on the raft? In what state was the youth? Did he recover? 3. What story did he tell?

Spellings and Meanings:—

De-spair', lose hope.
Ex-haust'-ed, worn out.
Oc'-cu-pants, persons on it.
Raft, float made of pieces of wood.
Stu'-por, as if dead
Swoon, fainting fit.
Sprung a leak, let in water
Tars, sailors

Summary:—A young sailor with his dog was found on a raft out on the ocean. He had been shipwrecked, and for several days and nights before his rescue the youth had been drifting about with none beside him but his faithful friend.

Exercise:—*Pick out the Nouns in the Summary, and say whether they are of the Singular or of the Plural Number; as,* **sailor,** *singular;* **days,** *plural.*

THE WONDERFUL PUDDING.

1. Our Uncle Robert one day came to us, and asked us to dinner. He said he would give us a pudding, the materials of which had given work to more than a thousand men!

2. "A pudding that has taken a thousand men to make! Then it must be as large as a church!"

"Well, my boys," said Uncle Robert "to-morrow at dinner-time you shall see it."

3. Scarcely had we taken our breakfast next day, when we prepared to go to our uncle's house.

When we got there, we were surprised to see everything as calm and quiet as usual.

4. At last we sat down to table. The first dishes were removed—our eyes were eagerly fixed on the door—in came the pudding! It was a plum-pudding of the usual kind—not a bit larger!

5. "This is not the pudding that you promised us," said my brother.

"It is, indeed," said Uncle Robert.

"O uncle! you do not mean to say that more than a thousand men have helped to make that little pudding?"

6. "Eat some of it first, my boy; and then take your slate and pencil, and help me to count the workmen," said Uncle Robert.

7. "Now," said Uncle Robert, "to make this pudding we must first have flour; and how many people must have laboured to procure it! The ground must have been ploughed, and harrowed, and sowed, and reaped. To make the plough and the harrow, miners, and smiths, and carpenters must have laboured.

8. "The leather of the harness for the horses had to be tanned and prepared for the harness-maker. Then, we have the builders of the mill, and the men who quarried the mill-stones, and made the machine-work of the mill.

9. "Then think of the plums, the lemon-peel, the spices, the sugar,—all these came from distant countries; and to get them here, ships, ship-builders, sail-makers, sailors, growers, merchants, and grocers, have been employed.

10. "Then we need eggs, milk, and suet."

"Oh, stop, stop, uncle!" cried I. "I am sure you have counted a thousand."

11. "I have not reckoned all, my child. We must cook the pudding, and then we must reckon colliers who bring us coal, miners who dig for tin and iron for the sauce-pan.

12. "Then there is the linen of the cloth it was wrapped in. To make this we must reckon those who grow the flax, and gather it, and card it, and spin it, and weave it, and all the workmen who make the looms and machines."

13. Robert and I both said we were quite satisfied that more than a thousand men had been employed.

New Words in this Lesson

car'-pen-ters	har'-rowed	quar'-ried	scarce'-ly
coll'-iers	ma-chine'	reck'-oned	su'-et
ea'-ger-ly	ma-te'-ri-als	re-moved'	tanned
em-ployed'	pro-cure'	sauce'-pan	to-mor-row

Questions:—1. What did Uncle [illegible] promise? 2. How [illegible] did [illegible] boys say it would be? 3. What surprised [illegible] boys? 4. What came [illegible] after [illegible] first dishes were removed? 5. What did [illegible] of [illegible] boys say? 6. What did Uncle Robert tell him to do? 7-9. What did Uncle [illegible] say was required [illegible] make the pudding? 10. What did one [illegible] the boys say? 11, 12 [illegible] had we been reckoned? 13. What did the boys then say?

Spellings and Meanings:—

Card, comb with a thing called a card [timber.
Car'-pen-ters, workers in
Coll'-iers, workers in coal mines. [terest.
Ea'-ger-ly, with great in-
Har'-ness, [illegible] and chains.
Har'-rowed, broken up
Ma-te'-ri-als, things it was made of
Quar'-ried, dug out.
Reck'-oned, [illegible] into [illegible]
Spin, [illegible]
Tanned, [illegible] skins
Weave, [illegible] into [illegible]

Summary:—More than a thousand men [illegible] employed in producing the materials of a plum-pudding. The corn has to be grown; a mill built; and the corn ground into flour. Sugar, fruit, and spices have to be brought from distant lands. Then eggs, milk, suet, coal, a sauce-pan, and cloth have to be provided.

Exercise:—*Give Kind, Number, and Gender of the Nouns in the Summary*: as, men, common noun, plural number, masculine gender.

STORIES OF MONKEYS.

1. A sailor once went ashore on the coast of South America. He had with him a number of red woollen caps for sale. On his way to a town at some distance from the coast, he had to pass through a forest, in which troops of monkeys were everywhere seen climbing among the trees.

2. At noon, as the sun was right overhead, the sailor had to take shelter from its burning rays. He lay down to rest under the shade of a large tree. Taking one of the caps out of his bundle, he put it on his head, and soon fell fast asleep.

3. When he awoke, he found, to his amazement, that the caps were all gone! He heard a most unusual chattering among the dense branches above

him, and, looking up, he saw the trees alive with troops of monkeys. On the head of each monkey was a red woollen cap!

4. The little mimics had watched his proceedings and having stolen his caps while he slept, had adorned their black pates with their booty. The monkeys gave no heed to his shouts, but only grinned at his rage.

5. Finding every attempt to get back his caps fruitless, he pulled off the one which he had put on his head, and threw it on the ground, crying out, "Here, you little thieving rogues, if you *will* keep the rest, you may take this one too!"

6. No sooner had he done this, than, to his great surprise, the little animals at once did the same. Each snatched the cap from his head and threw it on the ground! The sailor regained all his caps, and marched off in triumph.

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7. Among the rules of the port of London is one which forbids, under a heavy penalty, the firing of a gun from any vessel lying there. An armed ship had just come in from a long voyage, during which she had touched at several places, and at each of them had fired a salute on anchoring.

8. A monkey that was on board, naturally wondering why this was not done when he saw the anchor dropped at London, resolved, rather than that it should not take place, that he would fire the salute himself!

9. Accordingly, while the attention of all on board was engaged with the arrival of the ship, he

went to the cooking-place, and with the tongs took out a live coal, which he applied to the touch-hole of one of the guns; and at once the whole neighbourhood was startled by the roar of the cannon.

10. The captain of the vessel was prosecuted for breaking the law: and he could clear himself only by proving that the cannon had been fired by the monkey.

New Words in the Lesson:

ac-cord'-ing-ly	at-ten'-tion	nat'-u-ral-ly	re-gained'
a-dorned'	boot'-y	neigh'-bour-hood	sa-lute'
a-maze'-ment	chat'-ter-ing	pates	star'-tled
an'-chor-ing	grinned	pen'-al-ty	thiev'-ing
ap-plied'	mim'-ics	pro-ceed'-ings	tri'-umph
ar-ri'-val	mon'-keys	pros'-e-cut-ed	un-u-su-al

Questions: – 1. What had a sailor for sale? What had he to pass? 2. What did he put on before going to sleep? 3. Where were his caps when he awoke? 4. What had the monkeys done? 5. What did the sailor do and say? 6. What was the result of his action? 7. What is one of the rules of the port of London? What had an armed ship done? 8. What did a monkey resolve to do? 9. What did he do? 10. How did the captain clear himself?

Spellings and Meanings:

A-dorned', decked.
A-live', full of moving things.
A-maze'-ment, wonder, surprise.
An'-chor-ing, letting down the anchor.
Armed ship, ship with guns.
Boot'-y, something stolen.
Dense, thick, closely set.
Mim'-ics, imitators.
Pates, heads.
Pen'-al-ty, fine.
Pro-ceed'-ings, doings.
Pros'-e-cut-ed, charged with the offence.
Re-gained', got back.
Sa-lute', a discharge of cannon.
Touch-hole, hole for firing.
Tri'-umph, great joy.
Troops, great numbers.
Un-u-su-al, not often heard.

Summary: – Some monkeys saw a sailor asleep in a forest. He had a cap on his head, and a number for sale in a bundle. The monkeys stole the caps and put them on. When he awoke, he threw his cap down in despair. The monkeys imitated him, and so he got back all his caps. From another monkey a monkey fired a gun while a ship was in the Thames, thus breaking one of the rules of the port of London, and getting the captain into trouble.

Exercise: – Write twenty Nouns, Singular Number, Masculine Gender; as **sailor, boy, father.**

THE VOICE OF SPRING.

1. I am coming, little maiden!
With the pleasant sunshine laden,
With the honey for the bee,
With the blossom for the tree,
With the flower and with the leaf:
Till I come, the time is brief.

2. I am coming, I am coming!
Hark! the little bee is humming;
See! the lark is soaring high
In the bright and sunny sky;
And the gnats are on the wing,
Wheeling round in airy ring.

3. See! the yellow catkins cover
All the slender willows over;
And on banks of mossy green
Star-like primroses are seen;
And, their clustering leaves below
White and purple violets blow.

4. Hark! the new-born lambs are bleating;
And the cawing rooks are meeting
In the elms—a noisy crowd!
All the birds are singing loud;
And the first white butterfly
In the sunshine dances by.

5. Look around thee—look around!
Flowers in all the fields abound;
Every running stream is bright,
All the orchard trees are white,
And each small and waving shoot
Promises sweet flowers and fruit.

6. Turn thine eyes to earth and heaven!
God for thee the Spring has given;
Taught the birds their melodies,
Clothed the earth, and cleared the skies,
For thy pleasure or thy food:—
Pour thy soul in gratitude!

MARY HOWITT.

New Words in this Lesson:—

air-y
blos-som
cat-kins
caw-ing
clus-ter-ing
elms
gnats
hum-ming
la-den
mel-o-dies
or-chard
prim-rôs-es
prom-is-es
pur-ple
rooks
slen-der
soar-ing
wāv-ing
wheel-ing
wil-lows

Spellings and Meanings:—

Air´-y, light; gay.
Blos´-som, flowers.
Brief, short.
Cat´-kins, a kind of flower, in shape like a cat's tail.
Clus´-ter-ing, hanging in bunches.
Elms, forest trees.
Gnats, very small insects
Maid-en, girl
Mel´-o-dies, songs
Or´-chard, garden of fruit trees
Shoot, young branch
Soar´-ing, flying

Summary:—Spring gives new life to everything in nature. The trees are covered with leaves and blossoms, the bees and the birds are humming and singing among the trees; the early flowers come forth; and new born lambs are seen.

Exercise:—*Write twenty Nouns, Singular Number, Feminine Gender, as* **girl, mother, Mary.**

THE GATE WITHOUT A LATCH.

1. There was a farmer who had a little gate which opened from his yard into a field. This little gate wanted a latch, and therefore could not be fastened.

2. When he passed through the gate, he was very careful to pull it after him; but other people were not always so mindful. Even with all his care, the wind would often blow it open again after he had closed it.

3. The result was, that the gate was generally either flapping backwards and forwards in the wind, or standing wide open.

4. In this way the poultry were always getting out; and the sheep and the lambs were always getting in. It took up half the children's time to run after the chickens and drive them back into the yard, and to send the sheep and the lambs back into the field.

5. The farmer's wife was always telling him that he ought to get a latch; but he used to say that it would cost sixpence, and that it was not worth

while. He said that the children might as well be driving the sheep and the poultry into and out of the yard as be doing nothing. So the gate remained without the latch.

6. One day a fat pig got out of its sty, and, pushing open the gate, ran into the field, and thence wandered into a thick wood. The pig was soon missed, and a hue-and-cry was raised after it.

7. The farmer was in the act of tying up a horse in the stable; but he left it, to run after the pig.

His wife was ironing clothes in the kitchen; and she left her work, to follow her husband.

8. The daughter was stirring broth over the fire; and she left the broth, to run after her mother.

The farmer's sons and his man joined in the chase after the pig; and away they all went, men and women, pell-mell, to the wood.

9. But the man, making more haste than good speed, sprained his ankle in jumping over a fence. The farmer and his sons were obliged to give up chasing the pig, to carry the man back to the house. The good woman and her daughter also returned, to assist the poor man who was hurt.

10. When they got back to the house, they found that the broth had boiled over—that the dinner was spoiled: and that two shirts, which had been hanging before the fire, were scorched and utterly ruined.

11. The farmer scolded his wife and his daughter, for being so careless as not to take the shirts and the broth from the fire before they left the kitchen.

12. He then went to the stable, where he found

that the horse, which he had left loose, had kicked a fine colt and broken one of its legs. The servant was kept in the house for a fortnight, by the hurt to his ankle.

13. Thus, besides the injury done to the farmer's man, the farmer lost two weeks' work from his servant, a fine colt, a fat pig, and his two best shirts, to say nothing of the loss of his dinner—all for the want of a sixpenny latch!

14. In this way were two good old proverbs verified:—

For want of a nail the wheel comes off.
Safe bind, safe find.

New Words in this Lesson

as-sist′	i′-ron-ing	re-sult′	stir′-ring
chas′-ing	loose	scorched	ty′-ing
flap′-ping	prov′-erbs	six′-pen-ny	ut′-ter-ly
in′-ju-ry	re-mained′	sprained	ver′-i-fied

Questions:—1. What did the gate want? 2. What was the farmer careful to do? What did the wind often do? 3. What was the result? 4. What took up half of the children's time? 5. What did the farmer's wife say? What was his reply? 6. What happened one day? 7. What did the farmer do? What did his wife do? 8. What did the farmer's daughter, sons, and man do? 9. What happened to the man? 10. How did they find things in the house? 11. What did the farmer do? 12. What had gone wrong in the stable? 13. What was the loss? 14. What proverbs were verified?

Spellings and Meanings:—

Colt, young horse.
Hue-and-cry, chasing and shouting.
In′-ju-ry, hurt.
Latch, fastening.
Pell-mell, mixed together.
Poul′-try, hens, chickens.
Prov′-erbs, well-known sayings.
Re-sult′, what followed.
Scorched, burned on the outside.
Sprained, hurt by over-straining.
Sty, enclosed place.
Ut′-ter-ly, altogether.
Ver′-i-fied, shown to be true.

Summary:—A gate without a latch allowed a pig to get away. The farmer, his family, and his man ran to look for it. While they were away a fine colt's leg was broken, the farmer's two best shirts were scorched, the dinner was spoiled, and the servant sprained his ankle—all for the want of a sixpenny latch.

Exercise:—*Write twenty Nouns, and place Verbs after them: as,—*

Noun.	*Verb.*	*Noun.*	*Verb*	*Noun.*	*Verb.*	*Noun.*	*Verb*
The farmer	ran.	Boys	walk.	The bird	sings.	Men	eat.

THE SAINT BERNARD DOG.

1 The Saint Bernard dog is very large and strong, with a large head, long hair, and a bushy tail. He is a noble-looking dog, and he is as noble and intelligent as he looks.

2. His home is among the Alps—high mountains in Switzerland. There are several very steep and narrow roads, called "passes" which lead over these mountains into Italy.

3. There are snow-storms on these mountains even in summer; but in the long winter season they are extremely violent, and the passes are then very dangerous. These storms sometimes come on very suddenly—often after a bright and pleasant morning. The snow falls so thickly, that in a few hours the traveller is buried beneath the drifts.

4. Hundreds of persons have lost their lives in trying to pass over these mountains during the winter season. But many lives have been saved by the sagacity and kindness of the Saint Bernard dogs.

5. These dogs take their name from the Convent of Saint Bernard, where they are kept. This house is situated far up in the pass of the Great Saint Bernard—one of the most dangerous of the Alpine passes.

6. Here devoted monks live all the year for the purpose of aiding travellers, and with the help of their dogs, they have saved many lives.

7. The dogs are trained to look for lost travellers, and every day in winter they are sent out,

generally in pairs. One has a basket of food and a flask of wine or brandy strapped to his neck; the other has a cloak strapped upon his back. Thus any poor fainting man whom they may find may be at once supplied with food and clothing.

8. If the man can walk, they lead him towards the convent, barking loudly all the way for help, and to let the monks know that they are coming back. If the man is so faint and benumbed that he cannot move, they go back to fetch the monks, and to guide them to the spot where he is lying.

9. Sometimes the traveller is buried deep in the snow. If the monks were alone, they could never find him; but the dogs with their keen scent discover him; and they scratch up the snow with their feet.

10. One dog is said to have saved in this way as many as forty-two lives! His name was Barry; and he was as ingenious as he was brave. Once a woman, who was going up the mountain with her little son, was carried away by a snow-slip. Barry found the little boy unhurt, but cold and stiff. He managed, however, to get him on his back: and thus carried him to the door of the convent, where he was taken great care of by the monks.

New Words in this Lesson

aid'-ing	bran'-dy	in-tel'-li-gent	sit'-u-āt-ed
Al'-pine	Con'-vent	It'-a-ly	strapped
Alps	de-vōt'-ed	monks	sud'-den-ly
be-numbed'	ex-treme'-ly	sa-gac'-i-ty	Switz'-er-land
Ber'-nard	in-ge-ni'-ous	Saint	vi'-o-lent

Questions: 1. Describe the Saint Bernard dog. 2. Where is its home? 3. Where are mountains most dangerous? 4. How are many persons saved in these mountains? 5. Why is the Saint Bernard dog so valuable? 6. Who live in the Convent of Saint Bernard? 7. What do the monks train them when they are sent to look for lost travellers? 8. When do they do it? 9. How do they help lost travellers? 10. How was one dog discovered to have saved so many? 11. What do you know about Italy?

Readings and Meanings

Al'-pine, belonging to the Alps.
Alps, a great mountain range.
Be-numbed', powerless with cold.
Con'-vent, a religious house.
De-vōt'-ed, given up to their work.
Ex-treme'-ly, in the greatest degree.
Saint Ber'-nard, an Alpine mountain and pass.
In-ge-ni'-ous, ready in planning.
In-tel'-li-gent, wise.
It'-a-ly, a country of Europe.
Monks, men who live in a monastery.
Pass, road over mountains.
Sa-gac'-i-ty, quickness of Scent.
Sit'-u-āt-ed, built.
Snow-slip, mass of snow sliding down the mountain side.
Switz'-er-land, a country of Europe.
Vi'-o-lent, fierce.

Summary.—The Saint Bernard dog was very large and strong. They are kept at the Convent of Saint Bernard, where travellers often die in the snow-covered mountains. They are trained to look for lost travellers. One dog, named Barry, is said to have saved forty-two lives.

Exercise.—*Pick out the Adjectives in the Summary, and say which Nouns they qualify: as*, **Saint Bernard**, an adjective, qualifying dogs.

NEVER BE LATE.

Samuel. What a fuss our teacher makes if we come to school a little late! I am sure I see no harm in being a few minutes late: do you, Thomas?

Thomas. I know our teacher does not like us to be late, and I think we should try to please him.

Samuel. Well, I should like to know what harm there is in being a little late.

Thomas. I know what our teacher says, and he knows what is best. He is certainly very kind to us, and I think he requires from us only what will be for our good.

Samuel. What does he say about being late? I should like to know if there is any good reason against it.

Thomas. He says the habit is a bad one in many ways. If we come late, we disturb our teacher and the school. And then, he says, if we form the habit of being late at school, we shall be sure to be behind in other matters, and perhaps all through life.

Samuel. I never thought of such reasons before, and I am not certain but he is right. I remember, when I went late the other morning, the scholars all looked up to see who had come in, and the teacher waited till I had got to my seat before he asked the class any more questions.

Thomas. Yes, I recollect it; and I wished then that you would not be late any more. I think it a very bad practice. If you are late at school, you will be late elsewhere. My motto is, "*Never be late;*"

and I wish it were your motto too. What say you to that, Sam?

Samuel. Well, I think that you are right. I have never thought of the subject before. From this time your motto shall be mine; and I will try to keep to it.

Thomas. That's good. And now, Samuel, let us do what we can to get all the scholars in our school to adopt the same motto.

Samuel. That we will; and we can then all unite, and call ourselves the "Prompt Band."

New Words in this Lesson

a-dopt'	mot'-to	rea'-son	Sam'-u-el
dis-turb'	prac'-tice	rec-ol-lect'	sub'-ject
else'-where	Prompt	re-quires'	u-nite'

Questions:—What did the teacher make a fuss about? Why did the teacher object to late coming? What did Samuel remember? What did Thomas say that his motto was? What did Samuel say about this motto? What did the boys agree to do?

Spellings and Meanings

A-dopt', take for their own places.
Else-where, in other
Fuss, fault finding
Mot'-to, words to be remembered.
Prac'-tice, thing to do.
Prompt, ready.
Rea'-son, cause why.
Rec-ol-lect', bring to mind.
U-nite', join together.

Summary—A teacher objected to his scholars coming late, because those who did so not only disturbed the others but they formed a habit which would keep themselves behind all through life. Thomas and Samuel agreed to form a "Prompt Band," with the motto "Never be late."

Exercise—Add a Verb to each of the following Nouns: boys ..., girls ...; dogs ..., cats ..., the man ..., the horse ..., the river ..., the sun ...

THE SEAL.

1. Have you ever seen a seal? The common seal is found in the seas around our coasts, and in many other parts of the world. But the larger

kinds are seen only in the cold northern and southern seas.

2. The seal is a very curious creature. He loves to swim about all day catching fishes for his dinner. When he comes up to the surface to breathe, only his head is seen above the water.

3. He looks like a cat, when you see nothing but his head. He has large eyes, a broad nose, and holes in his head for ears. His body is like that of a fish. He has four short legs, which look like fins.

4. The two fore-feet have sharp claws, by which

the seal clings to the rocks and the ice. The hind-feet are webbed, like those of a duck. Seals can swim well; but when on land they cannot walk. —they can only shuffle and creep about. Look at the picture and you will see the webbed hind-feet.

5. When the seal has caught enough of fishes he often goes on shore. During summer he lies on the

rocks for hours, to bask and sleep in the sunshine. But he is so very cautious, that he seems to sleep with his eyes open.

6. In the cold northern seas, he takes a nap on the ice. But he is always careful to be near a hole, so that he can pop down in a minute. He will dive into the sea at the slightest noise.

7. The Greenlander could scarcely live without the seal. Its flesh and its fat form his chief food. Its skin is used not only for clothing, but as a covering for his tent and a casing for his boat. He even makes needles of its bones, and string of its sinews for his fishing lines and his bow.

8. The seal is generally killed by spearing. In winter, when the sea is frozen, a native often sits for hours near a hole in the ice, watching for a seal. He has his spear at his side, ready to be used when it is wanted.

9. He builds a little wall of snow to keep the wind off him, and there he sits in the cold, watching and waiting. The poor seal does not know that its enemy is lying in wait.

10. Many of the holes in the ice are made by the seal itself. It makes them that it may swim to them and put up its round head to breathe; for it cannot live long under the water.

11. When the seal comes to the hole, the man lifts his spear in a moment and drives it with all his might into its body. He has a rope fixed to the spear, and with it he drags the seal out of the water.

12. When the seal is fairly caught, there is great

rejoicing. The women and the children go out to meet the hunter. They have perhaps been without meat for some time, as is often the case with these poor people in winter.

13. They may have had no oil in their lamps and so could not even melt the snow into water when they wanted something to drink. But now a time of plenty begins. The lamps are full of oil, and the women bring out their cooking pots. Children snatch up bits of raw seal and put them in their mouths as if they were pieces of sugar-candy

New Words in this Lesson

cās'-ing	nor'-thern	sin'-ews	spear'-ing
cau'-tious	re-joic'-ing	slight'-est	sur'-face
Green'-land-er	shuf'-fle	south'-ern	web'-bed

Questions 1. What [illegible] 2. What kind of a [illegible] is he? 3. What does he have [illegible]? 4. Describe his feet. 5. Where does he lie? 6. What [illegible] 7. Of what use is the seal to [illegible]? 8. Where does he go to wait? 9. For what [illegible] 10. How does the man catch the seal? 11. [illegible] 12. What [illegible] place?

Spellings and Meanings

Bask, [illegible]
Cau'-tious, [illegible]
Green'-land-er, native of Greenland
Ly'-ing in wait, [illegible]
Nap, [illegible]
Shuf'-fle, [illegible]
Sin'-ews, the threads [illegible]
Spear'-ing, [illegible] with a spear
Webbed, joined by [illegible]

Summary [illegible] seals are seen in the cold northern seas. The seal [illegible] about in the water and [illegible] fishes. The bear is of great use to the [illegible]. The flesh and fat form his chief food. He uses the skin for clothing, as a [illegible], and for [illegible].

Exercise [illegible] Verbs: float; dip, stand, sing, burn, cry, [illegible]; fly

THE YOUNG WITNESS.

1. Not very long ago, a little girl, only nine years old, was brought forward as a witness in the trial of a person for stealing. The robbery had been committed in the house of the little girl's father. She had seen it. Her testimony was therefore very important.

2. The lawyer who was defending the thief did not want the little girl to appear as a witness; he knew that what she had to say would be very much against his side of the question.

3. So, when she was brought in, he said to her "Emily, do you know the nature of an oath?"

"I don't know what you mean, sir," said she.

"*There*, may it please your honour," said the lawyer to the judge; "she doesn't understand the nature of an oath. Is not this sufficient evidence that she is not fit to be a witness? Her evidence cannot be taken."

4. "Let us see," said the judge. "Come here, my little girl. Tell me if you have ever taken an oath?"

The blood rose to her neck and face at the very thought of it, as she answered, "No, sir."

5. "I do not mean a profane oath," said the judge. "Were you ever a witness in court before?"

"No, sir."

"Do you know what book this is?" said the judge, handing her a Bible.

"Yes, sir; it is the Bible."

6. "Have you ever read it?"

"Yes, sir; I read it every day."

"Do you know what the Bible is, my child?"

"It is the word of the great God."

"Now, my little dear, place your hand upon this book."

7. She put her hand upon it tremblingly. He then repeated to her the form of oath taken by one who is to be a witness. With her hand upon the Bible, she said, "I do solemnly swear that what I am now about to say is the truth, the whole truth, and nothing but the truth. So help me God."

8. "Now, my dear," said the judge, "you have sworn as a witness. Do you know what will happen to you if you do not speak the truth?"

"Yes, sir."

"What?"

"I shall be locked up in prison."

"Anything else?"

"Yes, sir. I cannot go to heaven."

"How do you know that?"

9. She took the Bible, ran her fingers over the leaves, and turned to the twentieth chapter of Exodus, the sixteenth verse, and read, "Thou shalt

not bear false witness against thy neighbour.' I learned that," said she, "before I could read the Bible."

"Did any one tell you that you were to be a witness in this case?" asked the judge.

10. "Yes, sir. After mother heard that I was to be called, she took me into her room, and asked me to repeat to her the Ten Commandments; and mother and I knelt down and prayed that I might understand how wicked it would be to bear false witness against a neighbour, and that God would help me to tell the truth if I had to go to court to-morrow.

11. "And when I went away, mother kissed me, and said to me, 'Remember the Ninth Commandment; and remember that whatever you say in court, God hears every word of it.'"

"Do you believe that?" asked the judge, while a tear glistened in his eye, and his lip quivered with emotion.

"Yes, sir," said the child, in a way which showed that she meant what she said.

12. "God bless you, my child!" said the judge. "You have a good mother.—This witness is competent," he added. "If I were on trial for my life to-day, and innocent of the charge, I would pray God to give me such a witness as this child. Let her be examined."

13. That little girl told the truth when she was called on to speak as a witness in court. But we should feel as if we were in court at all times when we open our lips to speak. This world is like a great court, and God is the Judge.

New Words in this Lesson:—

chap'-ter	ev'-i-dence	na'-ture	sol'-emn-ly
Com-mand'-ments	Ex'-o-dus	oath	suf-fi'-cient
com-mit'-ted	glis'-tened	pro-fane'	tes'-ti-mo-ny
com'-pe-tent	im-port'-ant	quiv'-ered	tri'-al
de-fend'-ing	in'-no-cent	rob'-ber-y	twen'-ti-eth
e-mo'-tion	law'-yer	six-teenth'	un-der-stand'

Questions:—1. Who was brought forward as a witness? Why was her evidence important? 2. Who did not wish her to appear? 3. What did he ask her? What did she say? What did he say then? 4, 5. What did the judge ask her? What book did he hand her? 6. What did she say when asked whether she had read it? 7. What did she then repeat? 8. What did she say would happen to her if she did not speak the truth? What else? 9. How did she know that? 10, 11. What had her mother done when she heard that the girl was to be a witness? What did the judge then ask the girl? And she replied? 12. What was the judge's decision? 13. What should we feel whenever we speak?

Spellings and Meanings:—

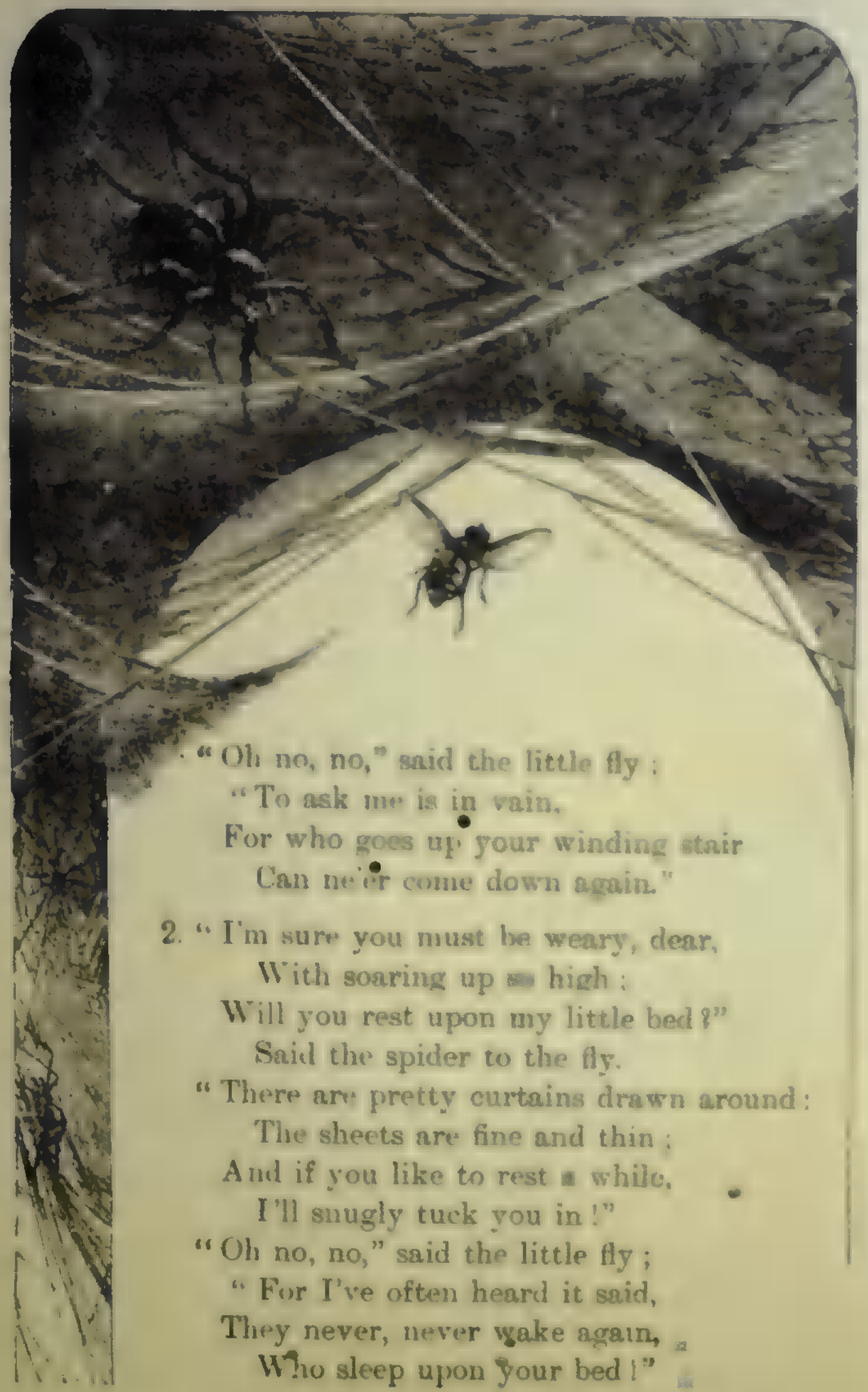
Com-mit'-ted, done.
Com'-pe-tent, fit.
Court, place where persons are tried.
Doesn't, does not.
E-mo'-tion, strong feeling.
Ev'-i-dence, proof.
False, not true.
Glis'-tened, shone.
In'-no-cent, not guilty.
Judge, one who tries persons.
Law'-yer, one who practises law.
Oath, to swear.
Pro-fane', wicked.
Quiv'-ered, trembled.
Tes'-ti-mo-ny, what the witness had to say.
Wit'-ness, one who gives evidence.

Summary:—A girl only nine years of age was objected to as a witness in a court of justice, on account of her youth. But when she told the judge that her mother had asked her to repeat the Ten Commandments, had prayed with her, and had told her to "Remember the Ninth Commandment," he said, "Let her be examined."

Exercise:—*Write six Adjectives before the word tree: as, a tall tree.*

THE SPIDER AND THE FLY.

1. "Will you walk into my parlour?"
Said the spider to the fly;
"'Tis the prettiest little parlour
That ever you did spy.
The way into my parlour
Is up a winding stair;
And I've got many curious things
To show you when you're there."



"Oh no, no," said the little fly;
"To ask me is in vain,
For who goes up your winding stair
Can ne'er come down again."

2. "I'm sure you must be weary, dear,
With soaring up so high;
Will you rest upon my little bed?"
Said the spider to the fly.
"There are pretty curtains drawn around:
The sheets are fine and thin;
And if you like to rest a while,
I'll snugly tuck you in!"
"Oh no, no," said the little fly;
"For I've often heard it said,
They never, never wake again,
Who sleep upon your bed!"

3 Said the cunning spider to the fly—
"Dear friend, what can I do
To prove the warm affection
I've always felt for you?
I have within my pantry
Good store of all that's nice
I'm sure you're very welcome—
Will you please to take a slice?"
"Oh no, no," said the little fly,
"Kind sir, that cannot be;
I've heard what's in your pantry,
And I do not wish to see."

4 "Sweet creature," said the spider,
"You're witty and you're wise;
How handsome are your gauzy wings,
How brilliant are your eyes!
I have a little looking-glass
Upon my parlour shelf,
If you'll step in one moment, dear,
You shall behold yourself."
"I thank you, gentle sir," she said,
"For what you please to say;
And bidding you good-morning now,
I'll call another day."

5. The spider turned him round about
And went into his den,
For well he knew the silly fly
Would soon come back again;
So he wove a subtle web
In a little corner sly,
And set his table ready
To dine upon the fly.

Then he came out to his door again,
And merrily did sing:
"Come hither, hither, pretty fly,
With the pearl and silver wing;
Your robes are green and purple—
There's a crest upon your head!
Your eyes are like the diamond bright,
But mine are dull as lead!"

6. Alas! alas! how very soon
This silly little fly,
Hearing his wily, flattering words,
Came slowly flitting by.
With buzzing wings she hung aloft,
Then near and nearer drew,
Thinking only of her brilliant eyes,
Her green and purple hue—
Thinking only of her crested head—
Poor foolish thing! At last,
Up jumped the cunning spider,
And fiercely held her fast!
He dragged her up his winding stair,
Into his dismal den,
Within his little parlour—
But she ne'er came out again!

7. And now, dear little children,
Who may this story read,
To idle, silly, flattering words,
I pray you, ne'er give heed;
Unto an evil counsellor
Close heart and ear and eye,
And take a lesson from this tale
Of the Spider and the Fly.

MARY HOWITT.

New Words in this Lesson:—

af-fec'-tion	crest'-ed	hith'-er	subt'-le
brill'-iant	dis'-mal	par'-lour	wi'-ly
buz'-zing	flat'-ter-ing	pur'-ple	wind'-ing
coun'-sel-lor	gauz'-y	spi'-der	wit'-ty

Spellings and Meanings:—

Af-fec'-tion, love.
Coun'-sel-lor, one who gives advice.
Crest, tuft
Dis'-mal, dark, gloomy.
Flat'-ter-ing, speaking false praise
Gauz'-y, thin, silky
In vain, of no use
Ne'er, never
Pan'-try, store-room
Spy, see
Subt'-le, cunningly made
That's, that is
There's, there is
'Tis, it is.
Web, fine thread spun by a spider
Wind'-ing, turning and twisting
You'll, you will.
You're, you are.

Summary—A subtle spider tried to persuade a fly to enter his den by telling her of the various and pretty things it contained. Then he began to praise her appearance, and particularly to admire her head, her eyes, and her wings. Forgetting her danger while listening to his flattery, she fell into his trap.

Exercise—Give the singular and the plural Number of twenty Nouns: as, **spider, spiders; fly, flies; den, dens; box, boxes; lady, ladies; leaf, leaves.**

THE ELEPHANT.

1. The home of the elephant is in the deep shady forest. He is the largest of all land animals, and is found both in Asia and in Africa.

2. One of the chief places in Asia where the elephant is found is the island of Ceylon. In this beautiful island, which is as large as Ireland, there are vast forests, which form the home of thousands of elephants. In these forests the trees grow thick and tall, so as to make many parts almost dark, while bright sunlight is above and around them.

3. The elephant likes the deep shady part of the forest, and seeks the coolest places that can be found. There he will stand, flapping his ears to drive away

the flies; or he will pull down a bough from a tree to fan himself.

4. He is fond, too, of bathing, and likes to be near a lake or running water, where he will stand for hours together, sucking up the water with his trunk, and spouting it all over his body.

5. He is fond of the fruits which grow in the forest, but he also eats the leaves and the young tender boughs of the trees. There is plenty of food

for him in his native forests, though he is not always content with what he finds there.

6. When the crops of rice and Indian corn are getting ripe, he often does a great deal of mischief. At night he comes out of the forest and breaks into a garden or field. He soon tears down the fence, and marches over the field, eating as much as he can, and trampling down more than he eats. Next morning the owner of the field awakes to find that the elephant has been there, and has gone back to the forest, leaving his crops all destroyed.

7. When a herd of elephants moves about in the forest, the oldest of the herd goes first. The young elephants and their mothers are put in the middle of the troop, where they are safest. Then all march along with a great trampling noise, the boughs of the trees bending and breaking before them. Though the elephant is commonly quiet and harmless, no one dares to attack a herd of elephants marching through the forest.

8. In Asia the elephant is tamed, and made to work. At one time the African elephant also was tamed. Soldiers in ancient times often went to battle mounted on the backs of African elephants. But now the elephant that lives in Africa is hunted chiefly for his valuable ivory tusks, out of which many useful and beautiful articles are made.

New Words in this Lesson

Af'-ri-can	cool-est	i'-vo-ry	sun'-light
ān'-cient	de-stroyed'	mis'-chief	ten'-der
Cey-lon'	flap'-ping	spout'-ing	tramp'-ling
com'-mon-ly	In'-di-an	suck'-ing	val'-u-a-ble

Questions:—1. Where is the home of the elephant? 2. Where is the elephant chiefly found in Asia? 3. What part of the forest does the elephant prefer? 4. Why does he like to be near water? 5. What food does he eat? 6. At what time does he often do great mischief? 7. Which elephant marches at the head of a herd? Which are put in the middle? 8. Where is the elephant tamed, and made to work? For what is the African elephant now chiefly hunted?

Spellings and Meanings:—

Af'-ri-ca, one of the great continents.
An'-cient, olden.
A'-si-a, one of the great continents.
Bat'-tle, fight.
Cey-lon', an island south of India.
For'-est, wooded ground.
Mis'-chief, harm.
Na'-tive for'-ests, where he was born.
Tamed, made useful to man; gentle; not wild.
Ten'-der, soft and juicy.
Tramp'-ling down, walking upon.
Troop, band.

Summary:—The elephant is the largest of land animals, and is found both in Asia and in Africa. He is fond of bathing standing in the water, he spouts it over his whole body. He is also fond of fruit; and he eats the leaves and the young tender boughs of trees. Sometimes he breaks into a field, and does much damage to the crops of rice and corn.

Exercise:—*Put the following Nouns and Verbs into sentences.* John, cow, London, trees, book, ladies; sings, eat, grow, stands, lies, say; as, **Men walk quickly.**

"TOO LATE" AND "BY-AND-BY."

1. Solomon Slow was the son of a gentleman who lived on the border of the New Forest. His mother called him Solomon, "Because," she said,

"he is a wise child; 'slow and sure' is certain to do well."

2. "Yes," said his father; "but he is too slow; and unless he become a little more quick, and a little less lazy, I shall never make a man of him."

3. When he was about ten years old, his father and some friends planned a picnic in the Forest, and hired a large van to take them there. They were to set out at seven in the morning. Solomon knew this, as he had heard his father say so the night before.

4. The sun was shining very brightly when he awoke at six the next morning; but he was as lazy as ever. "If I get up about ten minutes before seven," said he, "I shall be down in plenty of time." So he lay still in bed and heard all the party pass his door as they went down stairs.

5. They even called to him; but he gave no answer, and only lazily rolled himself up in the clothes. At last, up he jumped, dressed, and ran down stairs; but he found the breakfast-room empty, and the van gone!

6. Snatching up his hat, he ran as fast as he could down the road; but there was a high wind, and the dust was in clouds everywhere. He and the dust was in clouds everywhere. He screamed and bawled for the van to stop; but all in vain. No one could hear him; and at last, tired with running, and half choked with dust, he walked sulkily home.

7. But even this did not cure him. He was a lazy boy, and grew up to be a lazy man, and when in business, though the coach passed his door every

day, he was seldom ready. Just look at him, in the picture, running up the hill, and bawling, "Stop! stop!"

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8. Here is another story, of a boy who was always "putting off" what he had to do. He never did anything at the right time. "By-and-by" and "to-morrow" were his favourite words.

9. "James, will you fasten the garden gate?" said his mother.

"Presently, mother," said James, who was reading an amusing story.

10. James finished his story, and then went to fasten the gate; but in the meantime the pigs had got in, and had rooted up and destroyed more than could be repaired for months.

11. "Will you learn your lesson *now*, James?" said his mother.

"By-and-by, mother," replied James, who was making a new kite.

12. The kite was finished, but the lesson was never learned. Next day James lost his place in the class, and all chance of a prize.

13. What James was as a boy, he was as a man. He intended to take his money *to-morrow* from a bank that was not safe; but before to-morrow the bank failed, and he lost all.

14. He intended to insure his house and shop *to-morrow;* but before to-morrow they took fire, were burned, and he was ruined.

All should learn this proverb, "Never put off till to-morrow what you can do to-day."

New Words in this Lesson:—

bawled	hired	la'-zi-ly	re-paired'
bus'-iness	in-sure'	pic'-nic	Sol'-o-mon
emp'-ty	in-tend'-ed	planned	sulk'-i-ly

Questions:—1. What was the boy's name? Where did he live? What did his mother say of him? 2. What did his father say of him? 3. At what time was the picnic party to start? 4. When did Solomon awake? What did he say to himself? 5. What did he find when he came down stairs? 6. What did he then do? Did he succeed? 7. What kind of man did he turn out?—8. What did another boy do? 9. What did his mother ask him to do? 10. What did the pigs do before he had finished his story? 11. When did James say that he would learn his lesson? 12. What did James lose? 13, 14. What kind of a man was he? What proverb should all learn?

Spellings and Pronunciations:—

Hired, paid for the loan of.
In-sure', provide against loss by fire.
In-tend'-ed, thought he would. [In Hampshire.
New For'-est, a wide plain
Pic'-nic, a meal in the open air.
Re-paired', made right.

Summary:—Solomon Slow was a lazy boy. He got up late, and had to stay at home when his friends were enjoying a picnic in the Forest. He grew up to be a lazy man, and was often so late for the coach that he had to run after it bawling, "Stop! stop!"—Another boy named James always put off till to-morrow what he should have done to-day. As a boy he was behind at school, and when a man he was ruined.

Exercise:—*Arrange the following Nouns and Adjectives:* man, lion, box, woman, cat, hill; large, good, fierce, pretty, high, tame; *as,* a good boy.

LITTLE DICK AND THE GIANT.

1. Little Dick,—what a gay fellow he was! He used to go about singing and whistling the whole day long. He was always merry, and scarcely anything could make him sad.

2. One day, little Dick thought that he would have a ramble in the forest, at some distance from his home. So off he set in high spirits, singing and whistling till he made the woods ring again.

3. At last he reached a clear brook that ran through the wood; and being thirsty, he stooped to

drink. But just at that moment, he was suddenly seized from behind; and he found himself in the hands of a great, tall giant, a hundred times as big as himself!

4. The giant looked at him with great delight, and then put him into a large bag, and carried him off. Poor Dick tried all he could to get out of the bag, but to no purpose. He screamed, he struggled, he tried to tear the bag; but the giant only laughed at him for his pains, and went on, holding him fast.

5. At last the giant came to his house — a gloomy-looking place, with a high wall all round it, and no trees or flowers. When he got in, he shut the door, and took Dick out of the bag.

6. The poor captive now thought that his time was come; for when he looked around he saw a large fire, and before it two victims larger than himself roasting for the giant's dinner! The giant however, did not kill Dick, but only put him into a prison which he had prepared for him.

7. The prison was quite dark, with bars all round it; and the only food in it was a piece of dry bread and a cup of water. Dick beat his head against the iron bars, and dashed backwards and forwards, and felt very wretched.

8. Next day, the giant came and looked at Dick; and finding that he had eaten none of the bread, he took him by the head, and crammed some of it down his throat! Poor Dick was too much frightened to think of eating or drinking.

9. He was left all alone in the dark another day, and a sad day it was. The poor creature thought

of his own home, his companions, the sunlight, the trees, the flowers, and the many nice things he used to eat; and then he screamed, and tried to get between the iron bars, and beat and tore himself.

10. The giant came again, and wanted Dick to sing as he used to do, and be happy and merry. "Sing, sing, sing!" said he. But Dick was much too sad to sing. A prison is no place in which to sing songs. At last the giant grew angry, and took Dick out to force him to sing. Dick gave a loud scream, plunged and struggled, and then sank dead in the giant's hand!

11. This is a true story.—Poor Dicky was a *little bird*, and the giant was a *cruel boy*.

New Words in this Lesson:—

cap'-tive	gloom'-y	roast'-ing	vic'-tims
crammed	ram'-ble	stooped	whist'-ling

Questions:—1. What was poor Dick? 2. What did he one day set off to do? 3. What happened to him as he stooped to drink? 4. 5. What did the giant do with him? 6. What did Dick see at the fire, when he was taken out of the bag? What did the giant do with Dick? 7. What food was set there for him? What did Dick do when put in prison? 8. What did the giant do on finding that Dick had eaten nothing? 9. What did he think of when left alone in the dark? 10. Why did Dick not sing as he used to do? What happened when the giant took him out of prison? 11. What was Dicky? Who was the giant?

Spellings and Meanings:—

Cap'-tive, prisoner.
Crammed, thrust.
Gi'-ant, person of great size.
Gloom'-y, dark looking
High spir'-its, gay.
Pains, trouble.
Ram'-ble, wander
Time, end of his life.
Vic'-tims, things sacrificed

Summary:—When a cruel boy puts a little bird in a cage, it is as if a boy had been seized by a giant and put in a prison with iron bars all round it.

Exercise: *Write out 4 lines* (before the word *picture*), as, a beautiful picture

HOUSES MADE OF SNOW.

1. The people of the far, far north are called Eskimos. They have no houses such as we have to live in. All the winter they live in huts made of snow. These huts are very clean and white when they are new; but they soon turn dirty, and when the summer comes they begin to melt.

2. Sometimes the Eskimos find logs of wood on the shore, which have been drifted by the waves from some other country; and these they gather, and build their huts with them.

3. When they cannot get wood, they use the pure white snow. It is frozen so hard that it keeps firm all through the winter. Sometimes when the hut

becomes very warm with the lamp, and the people, and the dogs, the walls begin to drip a little; but a piece of fresh snow rubbed over the place soon makes it all right again. The windows of these huts are not made of glass, but of ice.

4. Though there is no fire in the hut, it is as warm as the Eskimo can bear it. He warms it with his lamp, which is nothing but a vessel like a saucer, full of oil. A great many little wicks float on the oil, and he lights them all. The burning wicks make the room warm. A cooking-pot hangs over the lamp; but he often eats his meat raw.

5. He has no chairs or tables, for he does not know how to make them; but there is a raised ledge all round the hut, covered with warm skins. This is his seat during the day, and his bed at night. But under the skins there is nothing but snow.

6. When the warm weather comes, the Eskimo is glad to get away from the snow hut. Its walls begin to melt, and he gets wet as he lies in bed, and often catches cold. He is therefore very glad to escape from it to his tent, which forms his summer residence.

New Words in this Lesson:—

Es'-ki-mos res'-i-dence sau'-cer weath'-er

Questions.—1. In what kind of huts do the Eskimos live? 2. How do they get wood to build with? 3. What do they use when they cannot get wood? How long does one of these huts last? How do the Eskimos make good the walls when they begin to melt? What are the windows made of? 4. How is the hut warmed? 5. What kind of bed does it contain? 6. Where do the Eskimos live in summer?

Spellings and Meanings:—

Drift'-ed, driven along.
Drip, to fall in drops.
E-scape', get away
Es'-ki-mos, North American Indians of the Frozen Zone
Raised ledge, a shelf.
Res'-i-dence, dwelling place.

Summary:—In winter the Eskimos live in huts made of snow. When frozen hard, the snow keeps firm for a long time. The windows are made of ice, and a raised ledge of snow covered with warm skins serves for a seat by day and for a bed by night. In summer the Eskimos live in tents

Exercise:—*Make three columns of the Nouns, Verbs, and Adjectives in the Summary; as,—*

Noun.	*Verb.*	*Adjective.*
winter	live	the

BRAVE BOBBY.

1. Some years ago, a ship bound for China had on board, with other passengers, an officer, his wife, their only child (a little boy five years old) and a large Newfoundland dog called Bobby.

2. Everybody in the ship liked Bobby, he was so good-tempered and frolicsome; but the boy was the dog's constant playmate. He was a merry little fellow, and as fond of Bobby as Bobby was of him.

3. One evening while the little boy and the dog were romping together, the ship gave a lurch, and splash went the child into the sea! A cry was raised, "A hand over b a hand over!" and the brave dog sprang over the side of the ship, clearing it like a greyhound, and swam towards the stern.

4. The little boy's father, half frantic, leaped with others into a boat; but it was too dark to see far before them. All gave the child up for lost.

5. At last they heard a splash on the left side of the ship. "Pull on, quick!" cried the father. The boat was turned, the men pulled with all their might, and in a moment brave Bobby was alongside, holding up the child in his mouth! Joy! joy! joy!

6. The boat was rowed back to the ship: the

half-drowned boy soon got better; the parents were delighted; and brave Bobby was caressed by all.

7. At the Cape of Good Hope the passengers were to be landed. The officer got into the boat, with his wife and child; but he told the sailors to hold the Newfoundland dog tight by the collar till the boat was some distance from the ship. "You will then see," said he, "what a strong swimmer he is."

8. Brave Bobby pulled and tugged to get loose, but all in vain; for they held him till the boat was near the shore. But no sooner did the officer give the signal than the dog was set at liberty, and away he went full dash into the sea.

9. Suddenly the poor animal set up a shrill howl, and threw himself out of the water. At first it was thought he had been seized with cramp; but it was worse than that—a shark was after him!

10. "A shark! a shark!" sounded from the boat to the ship. Bobby swam right and left, and dived and doubled, showing his teeth, and never allowing the shark time to turn on his back; without doing which the monster could not bite him.

11. The officer in the boat soon saw that there was little chance of reaching the spot in time to save the dog. Poor Bobby swam and dodged, till he was almost tired out. "Stop rowing," cried the officer to the men, "and turn the boat round."

12. Just at that moment the shark, which had got very close to the dog, turned on his back and opened his horrid mouth! Bobby was all but gone. His master rose, pointed his gun, and fired.

13. In a moment the water was tinged with blood: the horrid jaws of the shark were shattered to pieces! The men then rowed to the spot where Bobby was swimming about.

14. The officer pulled the dog into the boat; the child threw his little arms around him; and the men in the boat and the sailors in the ship cried out with joy, "Hurrah! hurrah! joy! joy! Bobby is safe! the shark is killed! Hurrah! hurrah!"

New Words in this Lesson:—

al-low'-ing	frol'-ic-some	play'-mate	splash
ca-ressed'	grey'-hound	romp'-ing	stern
dived	hor'-rid	shark	swim'-mer
dodged	lurch	shat'-tered	tem'-pered
doub'-led	mon'-ster	shrill	tinged
fran'-tic	New'-found-land	sig'-nal	tugged

Questions:—1. Who were on board a ship bound for China? 2. Why did everybody like Bobby? 3. What happened one evening? 4. What did the father do? 5. How was the boy saved? 6. How was Bobby treated? 7. Why was the dog kept back when the boat left the ship? 8. What did Bobby do to get away? 9. Why did he cry out? 10. How did he try to escape? 11. What did the officer soon see? 12. What did the officer do? 13. How was the shark affected by the shot? 14. What cry was heard when Bobby was saved?

Spellings and Meanings:—

Bound for, on the way to
Cape of Good Hope, the most southerly point of Africa
Ca-ressed', made much of; fondled
Chi'-na, country of Asia
Cramp, a [illegible] of the limbs caused by swimming
Dodged, [illegible]
Doub'-led, went back again over the same line
Fran'-tic, [illegible]; out of his senses
Frol'-ic-some, playful
Hand, one of the crew of the ship
Lurch, sudden roll to one side
New'-found-land, a large island of North America
Shark, a large fish that preys upon other animals
Shat'-tered, broken; shivered
Sig'-nal, sign for something to be done
Tinged, coloured

Summary:—A Newfoundland dog called Bobby jumped into the sea and saved the life of his master's child. Bobby was a good swimmer. Once, while following a boat containing his master, he was nearly seized by a shark; but he fought that fish, and killed his foe.

Explain (orally) *showing* how the *following actions are done*; as, John walks quickly. The horse runs. The unicorn flies ....; the boys walk ....; cows bellow.

A NOBLE BOY.

1. The woman was old, and feeble, and gray,
And bent with the chill of the winter's day:
The street was wet with the recent snow,
And the woman's feet were weary and slow.
She stood at the crossing and waited long,
Alone, uncared for, amid the throng.

2. Down the street, with laughter and shout,
Glad in the freedom of "school let out,"
Came the boys, like a flock of sheep,
Hailing the snow, piled white and deep.
Past the woman so old and gray
Hastened the children on their way.
Nor offered a helping hand to her
So meek, so timid, afraid to stir.

3. At last came one of the merry troop—
The gayest boy of all the group;
He paused beside her, and whispered low,
"I'll help you across, if you wish to go."

He guided the trembling feet along,
Proud that his own were firm and strong

4. Then back again to his friends he went,
His young heart happy and well content.
"She's somebody's mother, boys, you know,
For all she is old and poor and slow.
And I hope some fellow will lend a hand
To help *my* mother—you understand
If e'er she be poor and old and gray
When her own dear boy is far away."

5. And "somebody's mother" bowed low her head
In her home that night, and the prayer she said
Was, "God, be kind to the noble boy,
Who is somebody's son and pride and joy."

New Words in this Lesson:—

a-mid′	guid′-ed	paused	tim′-id
free′-dom	hail′-ing	re′-cent	un-cared′
gay′-est	laugh′-ter	throng	whis′-pered

Spellings and Meanings:—

A-mid′, among.
Chill, cold.
E'er, ever.
Hail′-ing, welcoming
Paused, stopped
Re′-cent, new-fallen.
She's, [illegible]
Throng, [illegible]
Tim′-id, [illegible]

Summary:—One winter's day [illegible] afraid to cross. Some school-boys came shouting along the road, when one of them ran to the old woman and helped her across. "She's somebody's mother," he said to his companions; "and when I am far away, I hope some one will help my mother."

Exercise:—*Give Adverbs showing* **when** *the following actions took place:* as, John fell **yesterday**. The king arrived .....; the train started ..... the queen is.....seen; I ..... wear a hat.

THE TRUNK OF THE ELEPHANT.

1. The long trunk of the elephant is a wonderful instance of design and skill. The neck of four-footed animals is usually long, to enable them to reach their food without difficulty; but the elephant has a short neck, to enable him more easily to support the weight of his huge head and heavy tusks. The difficulty of getting food is admirably overcome by his long trunk.

2. The trunk of the elephant is to him what the *neck* is to other animals. It is also a *nose* to him; for at the end of it there is a hollow place like a cup, in the bottom of which are two holes or nostrils, through which the animal smells and breathes.

3. It is an *arm* and a *hand* too, so that it has been said that the elephant *carries his nose in his hand;* and it might also have been said that he *breathes* by his hand. How strange it would seem to us if we were to breathe through our hand!

4. At the end of the trunk, there is a curious part, about five inches long, which forms a *finger.* With this finger the animal can pick up a pin or the smallest piece of money from the ground: he can select herbs and flowers, and take them one by one; he can untie knots; he can open and shut gates, by turning the keys or pushing back the bolts: and with this finger an elephant has been taught to make regular marks like letters, with an instrument as small as a pen!

5. The trunk of a full-grown elephant is about eight feet long. It can be made shorter or longer as the animal chooses, and can be moved with great ease in every possible direction. It has such prodigious strength that he can knock down a man with it, and pull up trees of moderate size by the roots.

New Words in this Lesson:—

ad'-mi-ra-bly	en-a'-ble	mod'-er-ate	se-lect'
de-sign'	huge	nos'-trils	sup-port'
dif'-fi-cul-ty	in'-stru-ment	pos'-si-ble	un-tie'
di-rec'-tion	knots	pro-dig'-ious	u-su-al-ly

Questions—1. Why has the elephant a [illegible] What [illegible] how to get his food? 2, 3. What [illegible] trunk [illegible] the place of? What other purposes does it serve? 4. What is [illegible] said of [illegible]? What can he do with this? 5. How long is the [illegible] of a full-grown [illegible]? Name an example of its great strength.

Spellings and Meanings:—

Ad'-mi-ra-bly, wonderfully.
De-sign', contrivance; plan.
En-a'-ble, allow.
Huge, very large.
Mod'-er-ate, not very great.
Nos'-trils, nose.
Pro-dig'-ious, [illegible].
Reg'-u-lar, equal sized.
Se-lect', pick out.
Skill, cleverness.

Summary:—The trunk of the elephant serves the purpose of a hand. It also serves as a nose, an arm, a hand, and a finger.

Exercise:—*Give Adverbs showing* **where** *the following events took place:* as, The man died **there**. The boy sat [illegible]. The horse came [illegible]. The sailor called ....; the tree fell ....; the soldiers went ....

THE SAILOR AND THE BIRDS.

1. Many years ago, when France and England were at war, both soldiers and sailors were often made prisoners. An English sailor had been confined for several years in a French prison; but he was set free on the return of peace.

2. After reaching London, he was one day passing near one of the bridges which there cross the River Thames, and he came to a man who had a number of birds for sale.

3. Jack, reminded of the long years he himself had spent in prison, could not bear to see the little creatures thus confined; so he bought the cage and *all* the birds! The man wondered what he could mean to do with so many.

4. Instead of walking away with his purchase, Jack opened the door of the cage, and took out the birds one by one, and let them fly away!

5. The bird-seller was amazed. He began to scold Jack for doing so foolish a thing; but Jack only laughed, and went on till every bird was on the wing.

6. "I tell you what," said Jack at last, "if you had been shut up within the bars of a prison as long as I have been, you too would have enjoyed seeing these birds set free."

7. Two little boys were standing near the sailor, and as Jack walked away they gave him a hearty cheer.

8. The jolly tar looked back, greatly pleased. He took off his cap and cried "Hurrah!" to the boys, who then went their ways, to tell to others the story of the Sailor and the Birds.

New Words in this Lesson:—

brid'-ges	French	jol'ly	re-mind'-ed
con-fined'	in-stead'	pur-chase	Thames

Questions:—1. What often happened when France and England were at war? When was the English sailor set at liberty? 2. Where was he passing the day? 3. What did the sailor buy? 4. What did he do with the cage? 5. What did the bird-seller do? 6. What did he say to the bird-seller? 7. Who cheered Jack as he walked away? 8. What did the sailor cry to the boys?

Spellings and Meanings:—

A-mazed', filled with wonder.
Con-fined', kept in prison.
His pur'chase, what he had bought.
On the wing, flying away.
Peace, end of the war.
Re-mind'-ed, put in mind.
Tar, sailor

Summary:—A sailor, who had been a prisoner in France, one day bought a cageful of birds from a man in London, and let them escape, saying how prison life had made him enjoy seeing birds set free.

Exercise:—*Write six Sentences, each containing a Noun and the Pronoun* **he**; *as*, Tom is a good boy; **he** learned his lesson.

IS IT RIGHT?

Alice. Edward, there is one question we ought always to ask ourselves when we are about to do anything; and if we did but ask and answer it honestly it would be of great service to us.

Edward. And what is that, Alice? I should like to know.

Alice. It is this—"Is it right?"

Edward. That is a very short question, surely; and, I think, a very good one.

Alice. Yes, it is; and yet, I fear, you have not always regarded it as you ought.

Edward. Indeed! When have I not?

Alice. I do not remember all the cases, but I think I could name two or three.

Edward. I should like to know what they are.

Alice. Well, then, you must promise not to be offended.

Edward. I certainly shall not be offended. I do not wish to do wrong, I am sure.

Alice. Well, Edward, when mother asked you to go an errand the other day, you told her you didn't want to go, and asked her why she did not send Mary.

Edward. That was because I was busy playing with my top.

Alice. But was it right, Edward, for you to say so? Only think how kind our dear mother is to us—how many things she does for our good.

Edward. Yes, I know that mother is very kind, and that we ought to obey and help her in every way; but I didn't think at the time.

Alice. That's it exactly: you did not think: you did not ask yourself, "Is it right for me to be unwilling to assist my mother?" And yesterday, you know, you were angry with your little brother. Was that right, Edward?

Edward. No, Alice, it was not; but the truth is that he troubled me when I was reading a story, and I pushed him away before I thought. It was wrong in me; and I am very sorry.

Alice. I will name only one other thing that I think of now. A few days ago, I saw you very slyly look on your book when the teacher asked you a question.

Edward. Well, that was because I couldn't think of the answer. I don't think there was any harm in that.

Alice. Why, Edward, how can you say so! It was certainly deceiving your teacher, and making him think you knew your lesson when you did not. Was that right, brother?

Edward. No, Alice, it was not; but I did not consider. I thank you for telling me. And now I promise that when I am tempted to do anything, I will always ask, before I begin, "IS IT RIGHT?"

Alice. O Edward, I am so glad to hear you say so; and if you will only do as you promise, you will be much happier for it.

New Words in this Lesson:—

con-sid'-er	ex-act'-ly	of-fend'-ed	troub'-led
de-ceiv'-ing	hap'-pi-er	re-gard'-ed	un-will'-ing
Ed'-ward	hon'-est-ly	ser'-vice	yes'-ter-day

Questions:—What question should we ask ourselves when we are about to do anything? Why did Edward not want to go on an errand for his mother? Why was he angry with his little brother? Who slyly looked at his book when the teacher asked him a question? What did he promise to do?

Spellings and Meanings:—

Couldn't, could not
De-ceiv'-ing, making him believe an untruth.
Of-fend'-ed, displeased.
Prom'-ise, give me your word.
Re-gard'-ed, looked upon; thought of.
Ser'-vice, use.

Summary:—Before doing anything we should always ask ourselves, "Is it right?" When Edward's mother asked him to go an errand, he said he did not want to go, because he was playing with his top. He was angry with his little brother for troubling him when reading a story; and he slyly looked on his book when his teacher asked him a question. He promised his sister that in future he would serve himself. "Is it right?"

Exercise:—*Pick the Pronouns out of the Summary, and say which Nouns they stand for; as,* **was** stands for the names of the persons reading; **him** for Edward.

THE ENGLISH GIRL AND HER AYAH.

1. A little English girl in India was one day playing outside her father's tent, near the edge of a jungle. Her attention was attracted by a beautiful little fawn, that seemed too young to run about, and which stood timidly gazing at the child with its soft, dark eyes.

2. The girl moved towards it; but the fawn started back, with a frightened look, and fled. The child gave chase: but the fawn was soon hid among the tall reeds and grass of the jungle.

3. When the girl's ayah missed her charge, she quickly hurried after her. But, so eager had the child been in chasing the fawn, that she was some distance from the tent before the ayah overtook her. Catching up the girl in her arms, she tried to return; but the grass and reeds around grew so high that she could scarcely see two yards before her.

4. She walked some steps with the little girl in her arms; then stopped, and looked round with a frightened air. "We are lost!" cried the poor Hindoo, "lost in the dreadful jungle!"

5. "Do not be so frightened, Motee," said the

fair-haired English girl; "God can save us, and show us the way back."

6. The little child could feel, as the Hindoo could not, that, even in that lonely jungle, a great and loving Friend was beside her. Again the ayah tried to find her way; again she paused in alarm.

7. What was that sound, like a growl, that startled her, and made her sink on the ground in terror, clasping the little girl all the closer in her

arms? Both turned to gaze in the direction from which that dreadful sound had come.

8. What was their horror on beholding the striped head of a Bengal tiger above the waving grass! The ayah uttered a terrified scream; and the little girl cried to God to save her.

9. It seemed like the instant answer to that cry, when the sharp report of a rifle rang through the thicket, quickly followed by a second: and the tiger, mortally wounded, lay rolling and struggling on the earth!

10 Edith, for that was the girl's name, saw nothing of what followed. Senseless with terror, she lay in the arms of her trembling ayah.

11. It was her father whom Providence had sent to the rescue. Lifting his little girl in his arms, he bore her back to the tent; leaving his servants, who had followed in his steps, to bring in the dead tiger.

A. L. O. E.

New Words in this Lesson:—

at-tract'-ed
a'-yah
Ben-gal'
clasp'-ing
fawn
gaz'-ing
growl
Hin-doo'
hor'-ror
hur'-ried
jun'-gle
mor'-tal-ly
Mo'-tee
Prov'-i-dence
re-port'
striped
strug'-gling
ter'-ri-fied
thick'-et
tim'-id-ly

Questions:—1 Where was a little English girl playing? What did she see? 2 What did the tiger do? Where did the ayah run? 3 What did the ayah do? 4 What did she say? 5. What did the child say? 6. What could the child feel? 7 What did they hear? 8 What did they see? 9 How were they saved? 10 How was Edith affected? 11 Who had saved them?

Spelling and Meaning:—

At-tract'-ed, drawn.
A'-yah, native Indian nurse.
Ben-gal', province of India.
Fawn, young deer.
Gaz'-ing, looking.
Growl, chase, ran after.
Hin-doo', native of India.
Hor'-ror, great dread.
Jun'-gle, wood full of grown trees and brushwood.
Mor'-tal-ly, so as to cause death.
Prov'-i-dence, God.
Re-port', sharp loud sound.
Ter'-ror, great fear.

Summary:—An English girl and her ayah, or nurse, were lost in a forest in India. While trying to find their way home, they heard the growl of a Bengal tiger. The ayah screamed in terror, but the little girl cried to God to save her. At that moment her father appeared, shot the tiger, and bore her home in safety.

Exercise:—Write six Sentences, each containing a Noun and the Pronoun him: as, Charles gave me a pen, and I told him to get me a book.

HALF THE PRICE.

1. A nobleman, who dwelt in a castle a long way from the sea-shore, was about to hold his marriage-feast. There was plenty of meat, game, and fruit, for the great occasion, but no fish, as the sea had been very rough.

2. On the very morning of the feast, however, a poor fisherman came to the castle with a large turbot. There was great joy in the house, and the fisherman was brought with his prize into the large room where the nobleman stood in the midst of his guests.

3. "A fine fish," said the nobleman. "Fix your own price; you shall be paid at once. How much do you ask?"

4. "Not a penny, my lord; I will not take money. One hundred lashes on my bare back is the price of my fish! I will not take one lash from the number."

5. The nobleman and his guests were not a little surprised; but the fisherman would not be persuaded. They reasoned with him in vain. At length the nobleman said,—

6. "Well, well, this fellow has a strange whim, but we must have the fish. So lay on lightly, and let the price be paid in our presence."

7. After fifty lashes had been given, "Hold, hold!" cried the fisherman; "I have a partner in this business, and it is right that he should get his share."

8. "What! are there two such fools in the

world?" said the nobleman. "Where is he to be found? Name him, and he shall be sent for at once."

9. "You need not go far for him," said the fisherman. "You will find him at your own gate, in the shape of your own porter. He would not let me pass until I promised that he should have half of whatever I should get for my turbot."

10. "Oh, ho!" said the nobleman, "bring him up at once; he shall certainly receive his half with the strictest justice."

11. The porter was therefore brought, and had to take his share of the bargain. He was then turned off from the nobleman's service, and the fisherman was amply rewarded.

am'-ply jus'-tice midst strict'-est
cas'-tle lash'-es oc-ca'-sion sur-prised'
fish'-er-man mar'-riage re-ward'-ed tur'-bot

Questions.—1. Why had the nobleman no fish at the feast? 2. Who arrived on the morning of the feast? 3. What did the nobleman say? 4. What price did the fisherman ask? 5. How was the statement received? 6. What order did the fisherman give? 7. When and why did the nobleman cry "Hold"? 8. What did the nobleman ask? 9. Who was the partner? 10. What order did the nobleman give? 11. How was the porter punished and the fisherman rewarded?

Spellings and Meanings.—

Am'-ply, fully. Midst, middle. Re-ward'-ed, paid.
Bar'-gain, thing agreed Part'-ner, one who shares Strict'-est, fullest: all be
Lash'-es, strokes with a with. Rea-soned with him, Tur'-bot, a kind of fish
whip. tried to make him Whim, an odd idea.
Mar'-riage, wedding. change his mind.

Summary.—On the morning of a nobleman's marriage feast a fisherman arrived with a large turbot, the price of which he said was one hundred lashes on his bare back. When he had received sixty, he asked the nobleman to wait for his partner, who had refused to allow him to pass till he promised to give him half of the price of the fish. The partner was brought, paid the sixty lashes, and then turned away, while the fisherman was rewarded.

Exercise.—Write the Spellings, Meanings, and Summary in a Book. Write a Letter to a Friend, telling her what she saw, Martha went to town for a loaf, when she

THE DUN COW.

1. "Yes, Mary; now that *I* am at home, you may walk anywhere with me, and fear nothing!" cried Alfred, whisking off the heads of the dandelions in the field with his cane, as he strolled along with his sister. "If a robber were to attack us now, or two, or half a dozen, I would—"

2. "Oh dear!" exclaimed Mary suddenly, "I had forgotten that this is the field in which the farmer keeps that vicious dun cow! There she is!—she has caught sight of us!"

3. "Run! run for your life!" shouted Alfred, as with levelled horns and tail in the air the dun cow came rushing towards them! Both the children began to run at their utmost speed, making for a stile which was not far off.

4. "Stop, brother!—oh, stop!" cried poor Mary. "A bramble has caught my jacket! Set me free—oh, set me free!"

5. The only answer which came was a bellow from the cow, which made Alfred run the faster, and so alarmed Mary that she pulled away her jacket by main force, leaving half a yard of lace on the bramble!

6. Panting, she reached the stile; and, scrambling over in a moment, joined her brother on the safe side. The ill-tempered cow gave another bellow, seeing the children beyond reach of her horns.

7. "What does she mean by that roar?" cried Alfred, shrinking back at the sound; for, however brave he might be against absent robbers, he was very much afraid of a cow.

8. "I suspect," laughed Mary, who had got over her fright, "that her bellow means much the same as the whisper of the bear to the traveller in the fable: 'Let courage be proved by deeds—not by words!'"

9. Let me tell you the story of the travellers and the bear:—

Once upon a time two men who were going on a journey had to pass through a forest. "I am afraid," said one, "that we may meet with wild beasts; I see the tracks of their paws on the ground."

10. "Fear nothing, friend Quickwit," cried the other, whose name was Braggart. "In case of an attack we shall stand by each other like men. I have a strong arm, a stout heart, and—"

11. "Hark!" cried the first, in alarm, as a low growl was heard from a thicket near. In an instant Braggart, who was light and nimble, climbed a tree like a squirrel, leaving his friend, who was not so active, to face the danger alone!

12. But Quickwit's presence of mind did not fail him. He could not fight, he could not run; but he laid himself flat on the ground, and held his breath, so as to appear quite dead. Out of the thicket rushed a huge bear, and at once made up to poor Quickwit; while Braggart, glad that he was now out of reach of the bear, looked down, trembling, from his perch in the tree.

13. One may guess what were the feelings of Quickwit when the bear snuffed all round him, coming so near that he could feel its warm breath,

when its muzzle was close to his ear! But Quickwit did not wince or move; and the bear, thinking him dead, plunged again into the thicket, leaving him quite unharmed!

14. When Braggart saw that the danger was over, he came down from the tree. Somewhat ashamed of his cowardly conduct, he tried to pass off the matter with a joke.

15. "Well, my friend Quickwit," he said, "what did the bear say to you when he whispered into your ear?"

"He told me," replied Quickwit, "to let courage be proved by deeds, not by words; and never again to trust a boaster like you!"

New Words in this Lesson:—

ac'-tive	dun	nim'-ble	sus-pect'
a-shamed'	ex-claimed'	pant'-ing	un-harmed'
Brag'-gart	for-got'-ten	Quick'-wit	ut'-most
bram'-ble	ill'-tem-pered	scram'-bling	vi'-cious
cow'-ard-ly	lev'-elled	shrink'-ing	whisk'-ing
dan'-de-li-ons	muz'-zle	strolled	wince

Questions: 1 [illegible] 2 What did Mary exclaim? 3 What did the [illegible] 4 What happened to Mary? 5 How did Mary get free? 6 Where did [illegible] 7 What did he ask? 8 What was Mary's reply? 9 What did [illegible] men going through say? 10 What did Braggart say? 11 [illegible] growl was heard? 12 What did Quickwit do? 13 What did the bear do? 14 What did Braggart then do? 15 What [illegible] did he ask? What was Quickwit's reply?

Spellings and Meanings

Bram'-ble, a wild [illegible] black [illegible]

Cour'-age, [illegible]

Dan'-de-li'-ons, [illegible] flower

[illegible]-full [illegible] colour

Fa'-ble, a [illegible] with a [illegible]

Lev'-elled horns, [illegible] towards [illegible]

Muz'-zle, [illegible]

Nim'-ble, quick to [illegible]

Pant'-ing, breathing very quickly

Plunged, rushed.

Shrink'-ing, drawing back from fear.

Strolled, [illegible]

Sus-pect', am inclined to think.

Ut'-most, greatest.

Vi'-cious, wicked; ill-tempered.

Whisk'-ing, cutting off.

Wince, [illegible] back.

Sentences — Alfred said that Mary might walk anywhere [illegible] fear [illegible]. When they [illegible] a lion they were attacked by a [illegible]. Alfred ran off and left Mary to [illegible], — showing that [illegible] be proved by deeds, not by words.

Exercise — *Write out the following, each containing a Noun and the Pronoun* **her**;

ex, [illegible] here yesterday, and I gave **her** a penny

THE LOST THIMBLE.

Mary. I wish you would lend me your thimble, Sarah; I can never find mine when I want it.

Sarah. I am willing to lend it to you; but I should like you to tell me why you always come to me to borrow when you have lost anything?

Mary. Because you never lose your things,—you always know where to find them.

Sarah. And how, think you, do I always know where to find my things?

Mary. How can I tell? If I knew that, I might sometimes contrive to find my own.

Sarah. I will tell you my secret, if you will hear it. I have a place for everything; and, after I have done using a thing, I always put it in its proper place, and never leave it to be thrown about and lost.

Mary. I never can find time to put my things away. And who wants, as soon as one has used a thing, to have to run and put it away, as if one's life depended on it?

Sarah. Your life does not depend upon it, Mary, but your convenience does. Let me ask, how much more time it will take to put a thing in its proper place than to hunt after it when it is lost, or to borrow from your friends?

Mary. Well, Sarah, I will never borrow from you again, you may depend upon that.

Sarah. Why, Mary, you are not offended, I hope?

Mary. No; but I am ashamed, and I have resolved, like you, to have a place for everything, and to keep everything in its place.

Boys and girls! remember this rule: *A place for everything, and everything in its place.*

New Words in this Lesson:—

bor'-row	con-ve'-ni-ence	ev'-er-y-thing	Sa'-rah
con-trive'	de-pend'-ed	prop'-er	thim'-ble

Questions:—What did Mary want to borrow? Why did Mary always ask Sarah to lend her things? What secret did Sarah tell Mary? Why did Mary not put her things away? What did Sarah ask Mary about putting things in their proper places? What did Mary resolve to do? What rule should boys and girls remember?

Spellings and Meanings:—

A-shamed', filled with shame.
Bor'row, get the loan of [a thing.
Con-trive', plan
Con-ve-ni-ence, comfort.
Lend, give me the use.
Re-solved', made up my mind
Thim'-ble, metal cover for [the finger.

Summary:—When Mary lost anything, she always went to Sarah to borrow. She said Sarah never lost her things. Sarah said that was because she had "a place for everything, and everything in its place."

Exercise:—*Make a Sentence using* love *as a* Noun. *Make a second Sentence using* love *as a* Verb.

ELEPHANT STORIES.

1. In the Island of Ceylon there are large herds of wild elephants. Many have been caught and tamed, and made useful in helping to build bridges, houses, and churches.

2. Travellers tell us that some of them are as careful about the neatness of their work as men could be! An elephant was once seen to step back a few yards, as if to see whether it had laid a block of stone straight; and then, apparently not satisfied, it returned and pushed it into its right place!

3. Some years ago, an engineer in Ceylon had to lay pipes to convey water nearly two miles, over hills and through woods where there were no roads. To help him in his work, he had to employ several elephants; and nothing could be more interesting than to watch the way in which the elephant engineers did their work.

4. Lifting up one of the heavy pieces of pipe, and balancing it with its trunk, each animal would march off with its load, and carry it safely over every obstacle, to the place where it was to be laid

When it reached the spot, it would kneel down and place the pipe exactly where the driver wished.

5. Once, when one of the elephants found it hard to get one of the pipes it had brought fitted into another, it went to the end of the pipe, and putting its head against it, soon forced it into its right place.

6. In a show of wild beasts at Bath, some years ago, there was a large, good-natured elephant. Among the crowd that went to see it was a baker. He thought it a clever thing to tease the elephant, by pretending to give it a cake, and then pulling away his hand.

7. The elephant bore this for some time well

enough, but at last it got angry. Putting its trunk out of the cage, it caught the baker round the waist, lifted him to the top of the caravan, and bumped his head with great force against the roof.

8. Everybody thought that the man would be killed; but all at once the elephant loosened its trunk, and dropped him from the roof to the ground, in the very midst of the people. There he lay for a minute or two, looking half dead: but when the people came to him, he got up and walked away as if nothing had happened.

9. Though he was very much frightened, he was not hurt; but you may be sure he never tried to play tricks upon elephants again.

ap-pa'-rent-ly car-a-van' en-gin-eer' loos'-ened
bal'-anc-ing church-es fit'-ted ob'-sta-cle
bumped con-vey in'-ter-est-ing pre-tend'-ing

Questions.—1. [illegible] herds of [illegible] elephants? [illegible] what are [illegible] to do? [illegible] In [illegible] 2. [illegible] does an elephant [illegible] to do? 3. In what [illegible] employed in Ceylon? 4. How [illegible] elephants [illegible] the pipes? 5. What [illegible] one of the elephants [illegible] when it found [illegible] the pipe to fit? 6. Who [illegible] it [illegible] to tease an elephant? 7. [illegible] did the elephant [illegible] to the man? 8. [illegible] killed? 9. What will he never do again?

Spellings and Meanings:

Ap-pa'-rent-ly, as if
Car-a-van', travelling waggon
Cey-lon', a [illegible] island of Asia, south of India
Em-ploy', make use of
En-gin-eer', a maker of roads, [illegible] etc.
Ob'-sta-cle, [illegible] in the way.
In'-ter-est-ing, [illegible]
Pre-tend'-ing, [illegible]
Sat-[illegible]-fied, pleased with its work

Summary.—Interesting [illegible] told about elephants. In Ceylon an engineer employed several elephants in laying [illegible] pipes. [illegible] so teased an elephant in a [illegible] that the animal [illegible] his head against the roof of the caravan, then dropped [illegible] on the ground. He was [illegible] hurt.

Exercise.—*Make Sentences, using the words,* ring, copy, walk, stand, laugh, fly, *as* Nouns, *and also as* Verbs; *as,* The ring is mine. Ring the bell.

DREAMING SUSY.

1. "How nice it would be," thought Susy, "if I lived in a palace, and had a fairy god-mother! There was once a princess whose cruel step-mother put her in a room where there was a great heap of feathers. 'These,' said she, 'are the feathers of a hundred different birds, and you must pick them all out before night, and have each kind by itself in a separate heap, or you shall die.' So the poor princess cried and cried."

2. "Susy, Susy," said Joe, "you are away off in the clouds. You are not studying at all."

"I will in a minute," said Susy; and then she went on:—

"So the poor princess cried, and cried, till at last her fairy god-mother came, and waved her wand three times, and every little blue feather and every little red one flew into its place at once.

3. "Now," thought Susy, "if a fairy could only come and wave over this lesson, and make every figure fly just where it ought, and make all the sense of it run into my brain, how splendid it would be! Then, when I recited, the teacher would say, 'You have done admirably, Miss Susan; go to the head of the class;' and —"

4. Ding-dong, ding-dong. "Why, that can't be the school-bell!" cried Susy, jumping up hastily.

"It is, indeed," said Joe; "and your wits have been on a goose-chase for almost three-quarters of an hour. I took your arithmetic away ten minutes ago, and you knew nothing about it"

5. Susy rose with flushed cheeks and tearful eyes, and held out her hand for the book. All the way to school she studied, with the help of her good-natured brother. But all in vain—the time was too short; and at the close of her recitation, instead of hearing any praise, she caught a very sad look on the teacher's face, and she was sent to take her place at the foot of the class!

6. But all these rebuffs seemed to have very little effect on Susy. That very night, as she sat with a little piece of sewing her mother had given her, the needle fell from her fingers, and her eyes were again fixed on vacancy.

7. "What are you after now, Susy?" said Joe.

"Well, I am thinking that if I had three pair of hands, one pair could do the hemming, another could sew on these strings, and another could stitch down that seam, and we'd have it all done in no time at all."

8. "Well, I never heard the like of that!" exclaimed Joe. "It seems to me that we should learn to use *one* pair of hands before fretting for more. Now I believe *I'll* dream a little too. Suppose that people came into the world with the ends of their arms all smooth, without any hands at all: and suppose that every time they were very good, or did any great thing, a finger grew out.

9. "I suspect they would be pretty thankful if they ever got *ten* of them. I wonder how many *you* would have had by this time! I know you would have dreamt you had two or three hundred, but I should not be a bit surprised if you had not the first joint of a forefinger."

10. Susy coloured, and bit her lip, but had not a word to say. It was long before she was cured of her bad habit of dreaming, but at last she was; and she would set diligently to work, knowing that the best fairies, to separate birds' feathers or do sums and write exercises, are Patience and Industry; and that they are always ready to come, if any little girl or boy really wants them.

New Words in this Lesson

dil'-i-gent-ly	flushed	In'-dus-try	sep'-a-rate
ef-fect'	fore'-fin-ger	pal'-ace	sew'-ing
ex'-er-cis-es	fret'-ting	Pa'-tience	stud'-ied
fair'-ies	häs'-ti-ly	re-buffs'	stud'-y-ing
fig'-ure	hem'-ming	reç-i-ta'-tion	va'-can-cy

Questions: 1. What did Susy think would be nice? What was a princess once told to do? By whom? What did the princess do? 2. What did Joe say to Susy? And she replied? How did the princess get her feathers sorted? 3. What did Susy wish? 4. What sounded while she was thinking of this? What showed how she had been dreaming? 5. What did she do all the way to school? What took place after the recitation? 6. What showed that school did her little good? 7. What did she say she was thinking? 8. What was Joe's dream? 9. What did he say would not surprise him? 10. What effect had this on Susy? What are the best fairies to help us in our work?

Spellings and Meanings:

Ad'-mi-ra-bly, worthy of praise.
Dil'-i-gent-ly, steadily.
Fair'-y, magic working.
Goose-chase, running after something foolish.
In'-dus-try, hard work.
Pal'-ace, splendid house.
Pa'-tience, power of enduring.
Re-buffs', checks.
Reç-i-ta'-tion, lesson.
Re-cit'-ed, said over.
Stud'-y-ing, learning.
Va'-can-cy, empty space; nothing.
Wand, staff.
We'd, we would.

Summary: Susy wished that a fairy would help her to do her lessons, and she also wished that she had three pair of hands with which to do her work. After she was cured of her bad habit, she found that the best fairies were Patience and Industry.

Exercise: *Give the plurals of* goose, sheep, church, glass, lady, copy, potato, brother, house; *as*, goose, geese.

THE OSTRICH.

1. The humming-bird is the smallest and the ostrich the largest of birds. There are humming-birds no larger than bees, while the ostrich is often ten feet in height.

2. The home of the ostrich is in the sandy deserts of Africa and Arabia. Among the Arabs it is called the *camel bird*, from the form of its neck and body. Like the camel, it dwells in the desert, and can live a long time without water.

3. Though the ostrich has wings, they are too small for it to fly with; but in running, it uses them like paddles. Spreading them out, and flapping them in the air, it runs along with great speed. The swiftest horse cannot keep up with it. As is said in the Bible, "*She lifteth up herself on high; she scorneth the horse and his rider.*"

4. The nest of the ostrich is simply a hole in the sand; and there the female bird lays ten or twelve large eggs. She watches her nest very closely, always sitting on her eggs at night, and leaving them only during the hottest part of the day.

5. The eggs are prepared for food in various ways; and some people are very fond of them. The shells, also, are made into cups and ornaments.

6. The ostrich is often hunted on horseback; but so rapid is its flight that the hunters would seldom succeed in catching it, if they did not know that it never runs in an even course, but zig-zag. So they let it go winding and doubling about, while they themselves push straight forward.

7. The chase sometimes lasts two or three days till the poor bird is tired out; for though swift, it is not so strong as a horse. When taken, it will turn round upon the hunters, and attack them furiously, till it is brought down.

8. Mr. Moffat describes the method of the wild Bushmen in hunting the ostrich:—A native is dressed with the skin and feathers of one of these birds; and, thus disguised, he goes near to a flock of ostriches. He mimics the real bird, by pecking on the ground, and shaking his feathers. He trots

and walks along, until he gets within bow-shot. Then he shoots a poisoned arrow at one of the flock, and generally succeeds in taking his prey.

9. A traveller relates that he once saw a young ostrich so tame that it let a little black boy mount on its back. No sooner did it feel the weight of the boy than it set off. At first it moved at a sharp trot, and then it stretched out its wings, and ran with the fleetness of a race-horse round the village!

10. The ostrich is chiefly valued for the beautiful white feathers of its wings and tail. The young reader may not know that the crest of the Prince of Wales is formed of three ostrich feathers, with a motto meaning "I serve."

11. The origin of this is said to have been as follows:—The King of Bohemia, who was slain at the battle of Crecy in the year 1346, wore this crest and motto. These were adopted by his conqueror, Edward, Prince of Wales, known as the Black Prince, and have been worn ever since by the heir to the British crown.

A-ra'-bi-a	con'-quer-or	meth'-od	pad'-dles
Ar'-abs	Crec'-y	Mof'-fat	poi'-soned
Bo-he'-mi-a	de-scribes'	or'-i-gin	scorn'-eth
Brit'-ish	dis-guised'	or'-na-ments	va'-ri-ous
Bush'-men	fu'-ri-ous-ly	os'-trich	zig-zag

Questions: 1. Name the largest and the smallest of birds. 2. Where is the home of the ostrich? What four-footed animal is it like? Why? 3. What is said about the ostrich in the Bible? 4. Where does the ostrich make her nest? 5. Of what use are the eggs? 6. How do horsemen run down the ostrich? 7. How do the wild Bushmen hunt the ostrich? 8. How long does the chase sometimes continue? 9. What is the story of the ostrich in the picture? 10. For what is the ostrich chiefly valued? 11. Whose crest is formed of three ostrich feathers?

Spellings and Meanings:—

A-ra´-bi-a, a country of Asia.
Ar´-abs, people of Arabia.
Bo-he´-mi-a, a part of Austria.
Bush´-men, Africans.
Creç´-y, fought between English and French.
Dis-guised´, hidden by a false dress.
Meth´-od, plan.
Mr., mister.
Mof´-fat, a missionary.
Or´-i-gin, first cause.
Pad´-dles, broad, short oars.
Prince of Wales, Queen's eldest son.
Zig´-zag, with short turns.

Summary:—The ostrich is the largest bird in the world. It often reaches a height of ten feet. It is found in Africa and Arabia. Though the ostrich has wings, it cannot fly. Ostrich feathers are very valuable.

Exercise:—*Give the Masculine Gender of the Nouns*, **girl, woman, queen, lady, mistress, lioness**; *as*, **girl, boy**.

THOUGHTLESS CRUELTY.

Uncle. George, I was sorry to see you to-day with those boys who were throwing stones at the birds. That was cruel sport.

George. Why, uncle, all the boys throw stones at birds. Is there any harm in doing so?

Uncle. If you made a little ship, and rigged it, would you like to see a boy come and with a stone or a stick knock it all to pieces, just for the pleasure of destroying it? No. You would be very angry, would you not?

George. Angry! Yes, indeed; no boy has a *right* to use my things so.

Uncle. That is true. Well, have you any right to kill the little birds? A bird is something which God has made; and he takes pleasure in his works. Do you know that a bird has one of the finest musical instruments in his throat that can be heard?

George. A musical instrument in a bird's throat! Whoever heard of such a thing!

Uncle. Yes; in a bird's throat there is a little fine, soft flute, that can play as many notes as a piano.

George. A flute in a bird's throat! What a droll idea!

Uncle. The little pipe through which a bird plays his tunes is more curiously made than any flute made by man,—it is so small, yet so perfect. It fits into his throat so easily as never to interrupt his eating or breathing; and it is so flexible that it turns whichever way he bends his head or his throat.

George. Well, that is strange. I might have heard a bird sing for a month and never have thought of all this.

Uncle. Then a bird's bones and joints are made with as great care as if God spent much thought upon them. Birds, too, have a mill inside of them.

George. A mill!

Uncle. Yes; a little stomach, which is their mill, where they grind the seeds that they eat, and turn them into blood. They have also nerves.

George. What are nerves?

Uncle. Nerves are what you feel with. With the nerves of your mouth, you *taste*; with the nerves of your ear, you *hear*; with the nerves of your nose, you *smell*; with the nerves of your eye, you *see*; and with the nerves that cover your body, you *feel*. Birds are provided with nerves in the same way that you are.

And then their little bodies are full of muscles

stretching, and pulling, and drawing up,—in use at all times, and yet without wearing out or going wrong in any way.

George. I fancy that Lucy's two birds Jacky and Pet don't know what has been done for them.

Uncle. Don't you suppose that God loves his little birds? And what do you suppose he thinks of boys who go into the woods and the fields, where hundreds of happy birds are hopping about and singing in the warm sunshine and in the quiet shade, and who take pleasure in killing them?

George. I never thought before that God cared so much for the birds.

Uncle. I am sure it is often because boys do not think, that they act unkindly. Remember, therefore, that God has made the birds as well as you, and that he cares for them as well as for you.

New Words in this Lesson:

breath'-ing	fin'-est	mus'-cles	rigged
cu'-ri-ous-ly	flex'-i-ble	mu'-si-cal	stom'-ach
de-stroy'-ing	flute	nerves	un-kind'-ly
droll	i-de'-a	per'-fect	which-ev'-er
fan'-cy	in-ter-rupt'	pi-a'-no	who-ev'-er

Questions:—What did his uncle see George doing? What did he think would make George angry? Who made the birds? What has a bird in its throat? What does it play like? How is its perfection shown? What is a bird's stomach? Of what use are its nerves? Of what use are its muscles? What question did George's uncle ask about boys who harm birds? What had George to remember?

Spellings and Meanings:—

Cru'-el, pain-giving.
Cu'-ri-ous-ly, skilfully.
Droll, funny.
Flex'-i-ble, easily bent.
Flute, a pipe sounded by blowing.
Grind, crush; break up.
In-ter-rupt', stop.
Mill, machine for grinding.
Mus'-cles, fleshy parts of the body.
Mu'-si-cal, music-making.
Nerves, fibres which connect all parts of the body with the brain.
Per'-fect, complete.
Pi-a'-no, musical instrument that meets and sets.
Rigged, fitted it with.
Sport, game.

Summary:—It is cruel sport to throw stones at birds. If any one threw stones at any pretty thing we had made we should be angry. God made the birds. He gave them curious musical instruments with which they make sweet music; and in the making of their bodies he showed great power and skill. We should remember that God cares for the birds as well as for us: we are all the work of his hands.

Exercise:—*Give a Common Noun for each of the following Proper Nouns*—**Samuel, London, Scotland, Thames, Sarah, Europe, Atlantic;** *as* **Samuel, boy.**

THE BLIND BOY.

1. Oh! say, what is that thing called light,
Which I must ne'er enjoy?
What are the benefits of sight?
Oh! tell a poor blind boy!

2. You talk of wondrous things you see—
You say the sun shines bright;
I feel him warm, but how can he
Or make it day or night?

3. My day or night myself I make,
Whene'er I sleep or play;
And could I always keep awake,
With me 'twere always day.

4. With heavy sighs, I often hear
You mourn my helpless woe;
But sure with patience I can bear
A loss I ne'er can know.

5. Then let not what I cannot have
My peace of mind destroy:
While thus I sing, I am a king,
Although a poor blind boy.

COLLEY CIBBER.

New Words in this Lesson:—

ben'-e-fits help'-less mourn sighs won'drous

Spellings and Meanings:—

Ben'-e-fit's, things we en- | **Peace of mind**, contentedness. | **Woe**, blindness | similar things
Mourn, grieve over. | joy.
Ne'er, never. | **'Twere**, it were | **Won'drous**, strange | an exclamation.
Pa'-tience, power to suffer. | **Whene'er**, whenever.

Summary: A poor blind boy asks how he can make the best use of his day or night is made to his sleeping or grieving. Then he tells the friends not to mourn on account of his blindness as he is grateful for one favor of him he never knew.

Exercise:—*Give the* Singulars *of the* Nouns: mice, women, oxen, feet, teeth, cherries, heroes, halves; *as*, mice, mouse.

TRY AGAIN.

1. "Have you finished your lesson, George?" said Mr. Prentice to his son, who had laid aside his book, and was busily engaged in making a large paper kite.

"No, father," replied George, hanging down his head.

2. "Why not, my son?"

"Because it is so difficult, father. I am sure that I shall never learn it. Besides, I could not remember it after I had learned it, my memory is so bad."

3. "My dear boy, you are deceiving yourself. You can learn as well as any one, if you will only try."

'But have I not tried, father?" again urged George.

4. "Well, try again. Be in earnest, and you will soon learn it. To show you that it only requires perseverance, I will tell you a story:—

5. "One of the dullest boys at a village school, more than thirty years ago, went up to repeat his lesson one morning, and, as usual, did not know it. 'Go to your seat!' said the teacher angrily. 'If you don't pay more attention to your lessons you will never be fit for anything.'

6. "The poor boy stole off to his seat, and bent his eyes again upon his lesson.

"'It is of no use; I cannot learn,' he said in a whisper to a companion who sat near him.

7. "'You must try hard,' replied the kind-hearted boy.

"'I have tried, but it is of no use; I may just as well give up at once.'

"'*Try again*, Henry!' whispered his companion.

8. "These two little words gave him fresh spirit, and he bent his mind again to his task. He began to find the sentences lingering in his memory; and soon, to his surprise and pleasure, the whole lesson was mastered! He then rose from his seat and proceeded to the teacher's desk.

9. "'What do you want now?' asked the teacher.

"'To say my lesson, sir.'

"'Did you not try half an hour ago?'

"'Yes; but I *can* say it now, sir,' said the boy.

"'Go on, then.'

10. "Henry commenced, and repeated the whole lesson without missing a single word! The master gave him a look of pleasure as he handed back his book.

11. "From that day," continued Mr. Prentice, "there was no boy in the school who learned more

rapidly than Henry. From that day till the present hour he has been a student; and he now urges his son George to 'try again,' as he tried."

12. "And was it indeed *you*, father?" asked his son, eagerly looking up into the face of his kind parent.

"Yes, my child. That dull boy was your own father in his early years."

13. "Then I *will* try again," said George, in a decided tone; and, flinging aside his half-made kite, he turned and re-entered the house, and was soon busy with his lesson.

14. "Well, what success, George?" asked Mr. Prentice, as the family gathered around the tea-table.

"I learned the lesson, father!" replied the boy. "I can say every word of it."

15. "Did you find it hard work?"

"Not so very hard, after I had once made up my mind that I *would* learn it. Indeed I never stopped to think, as I usually do, but went right on until I had mastered every sentence."

16. "May you never forget this lesson, my son!" said Mr. Prentice. "You now possess the secret of success. It lies in never stopping to think about a task being difficult or tiresome, but in going steadily on bit by bit."

New Words in this Lesson—

af-fĭ'-gri-ly	dull'-est	per-se-vēr'-ance	stu'-dent
com-menced'	ear'-nest	Pren-tice	tire'-some
con-tin'-ued	fling'-ing	sen'-tenc-es	urged
de-cid'-ed	lin'-ger-ing	stead'-i-ly	ur'-ges

Questions—1. What was George busy with instead of doing his lesson? 2. What reasons did George give for not being able to learn his lesson? 3. What did his father say that he was doing? 4. What did he say it only required? 5. What kind of boy was his story about? 6. What did he whisper to his companion? 7. What was the reply? 8. What effect had the words "Try again" on the boy? 9, 10. How did he succeed? What did the teacher do as he handed him back his book? 11. What was the result? 12. Who in all did Henry turn out to be? 13. What did George do when he heard that? 14. With what result? 15, 16. Wherein lies the secret of success?

Spellings and Meanings—

De-cid'-ed, settled; made up his mind.	Mem'-o-ry, power to remember.	Sen'-tenc-es, words which put together make sense.
Dull'-est, slowest at learning.	Per-se-vēr'-ance, power to keep at it.	Stu'-dent, one who studies.
Lin'-ger-ing, remaining.	Spir'-it, hope.	Tire'-some, that wearies.
Mas'-tered, learned.		Urged, spoke earnestly.

Summary—A boy said that he was unable to learn his lesson, or to remember it after it was learned. He also said that he was disturbing himself, and that it only required perseverance. His teacher told also a story about his own youth. When a boy he had been like and had said what a companion had urged him to "try again." He had done so, and had succeeded not only then, but ever afterwards. George took the hint, and succeeded as his father had done.

Exercise—Make sentences, using the words, **swim, drive, jump, bite, fight, turn,** as **Nouns**, *and also as* **Verbs**; as, Tom had a **swim** in the pond. He can **swim** in the pond.

ELEPHANT STORIES.

1. An Englishman who travelled a great deal in India, says: "I performed many long journeys upon an elephant; and whenever I wished to make a sketch, the docile creature would stand perfectly still till my drawing was finished.

2. "If at any time I wished ripe mango-fruit which was growing out of my reach, he would select the most fruitful branch, break it off, and offer it to me with his trunk.

3. "Sometimes I gave him some of the fruit for himself, and he would thank me by raising his trunk three times over his head making a gentle murmuring noise as he did so.

4. "When branches of trees came in my way, he broke them off at once, twisting his trunk round them; but he often broke off a leafy bough for himself, and used it as a fan to keep off the flies, waving it to and fro with his trunk. When I was at breakfast in the morning, he always came to the tent door to be cheered by my praise and caresses, and to receive fruit and sugar-candy."

5. An elephant was in the habit of passing over a small bridge leading from his master's house into a town in India. He one day refused to go over it, and it was only by cruelly goring him with a spear that he could be forced to venture on the bridge,

the strength of which he first tried with his trunk, showing that he suspected something.

6. At last he went on; but before he could get over, the bridge gave way, and both the elephant and his driver were cast into the ditch. The fall killed the driver, and very much injured the elephant.

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7. A poor woman, in one of the cities of India, had a stall in the market-place, where she sold fruit. An elephant used to go by, and always stopped to look at her stall. She knew how fond the elephant was of fruit, and she used, now and then, to give him some.

8. One day the elephant fell into a passion with his keeper. He broke loose, and ran through the market, trampling down everything before him.

9. The people at the stalls ran away as fast as they could. The poor woman left her stall and ran too. But she forgot, in her fright, that her little child was sitting on the ground, close by the stall!

10. It was just in the elephant's way, and you would think it must have been trampled to death. But the elephant knew the child again, and knew that this was the stall where he had been fed with fruit.

11. Though he was in a passion, he stopped. He looked at the child, and picked it up with his trunk. Then he set it out of his way, and went on. You may think how glad the poor woman was to see her child safe.

New Words in this Lesson :—

ca-ress'-es	Eñ'-glish-man	man'-go	rais'-ing
cit'-ies	fruit'-ful	mur'-mur-ing	sketch
cru'-el-ly	gōr'-ing	pas'-sion	sus-pect-ed
ditch	in'-jured	per-fect-ly	tram'-pled
dōc'-ile	lead'-ing	per-formed'	vent'-ure

Questions :—1. What did an elephant do when his master wished to make a sketch? 2. Or to get mango fruit? 3. What did he do when he got some of the fruit? 4. What use did he sometimes make of a leafy bough? 5. How was an elephant forced to venture on a bridge? How had he shown that he suspected something? 6. What happened when he went on the bridge? 7. How did the poor woman in India make the elephant her friend? 8. What happened one day? 9. What did the poor woman forget? 10. If, had the elephant trample on the child? How did the elephant treat the child?

Spellings and Meanings :

Ca-ress'-es, patting.
Dōc'-ile, easily managed.
Gōr'-ing, pricking.
Lead'-ing, going in the direction, leading the
Man'-go, fruit of the
Mur'-mur-ing, low sound
Sketch, drawing
Sus-pect-ed, had an idea

Summary : An Englishman had an elephant that would patiently sit when he wanted to make a sketch of anything, and that walked round for him as they passed along.—An elephant, thinking a bridge was unsafe, refused to go over it. His driver compelled him: the bridge gave way, and the driver was killed.—One day an elephant broke loose from his keeper. Trampling down all before him, he yet stopped to lift a child out of the way.

Exercise :—*Make Nouns out of the following Verbs*, **weigh, laugh, move, bless, fought, read, write, meet ; as, weigh, weight.**

STORY OF A SCOTTISH SHEPHERD BOY.—I.

1. Among the mountains of Scotland there lived, many years ago, a shepherd and his wife with their only son, a boy about ten years of age. The cottage in which they dwelt was in a glen far from any public road.

2. One evening the boy's mother was very ill. It was a quiet evening in the month of December. There was no wind, but snow had begun to fall

softly all around. The shepherd took down his long staff, meaning to set out for the village to get medicine for his wife.

3. "Father," said the boy, "I know the sheep-path through the glen as well as you. Let me go to the doctor, and do you stay beside mother. With Shag walking before me all the way, I shall be quite safe." The shepherd consented, and the boy soon set out on his errand.

4. He was a brave boy. He had been used to the mountains from his earliest years, and had no fear. The dog Shag went with his young master, wagging his tail and bounding along the hill-side with great joy.

5. The boy went safely on, and at length reached the village. He saw the doctor; and after getting from him the medicine for his mother, he started on his return home.

6. The snow continued to fall; but the boy went bravely on, hoping soon to reach the cottage in the glen. Shag went on before, as if to make sure at every turn of the narrow path that all was safe.

7. Suddenly he stopped, and began sniffing and smelling about. "Go on, Shag!" cried his young master; but the dog would not move. "Shag, go on!" repeated the boy.

8. Shag seemed obstinate for the first time in his life, and at last the boy moved on alone. He less of the warning growl of the faithful dog. He had proceeded but a few steps when he fell over a precipice which had been concealed by a wreath.

9. At the cottage many hours passed while the shepherd and his wife were waiting and watching for their boy's return. The father often snuffed a candle which he had placed in the window, in the hope that his son would see it on his way up the glen. He piled wood on the fire, and spoke words of comfort to his wife, though he himself at last began to fear that something was wrong.

10. Often did he go to the door; but not a sound could he hear, and nothing could he see moving on the wide waste of snow.

"Perhaps the doctor was not at home, and he has waited for him," said his poor mother. She felt so uneasy at her boy's absence that she almost forgot her own sufferings.

11. It was nearly midnight when the well-known bark of the faithful Shag was heard at the door. "My son! my son!" cried both parents at the same moment. The cottage door was opened, and Shag entered—but without his master!

12. "My poor boy has perished in the snow!" exclaimed the mother. But at that moment the father saw a small packet tied to the dog's neck. He took it off and said,—"No, our son is not dead. Here is the medicine tied up in his handkerchief. He has hurt himself, or fallen into some hollow in the glen. I must go and seek him. Trust in God, and wait till I return."

13. The father was soon wrapped up, and ready to go in search of his son. In an instant Shag was again on his feet, and showed unbounded joy as the shepherd left the cottage.

New Words in this Lesson:—

can'-dle	hand'-ker-chief	ob'-sti-nate	snuff'-ing
con-cealed'	heed'-less	pack'-et	staff
De-cem'-ber	med'-i-cine	prec'-i-pice	un-bound'-ed
doc'-tor	mid'-night	pub'-lic	un-ea'-sy
ear'-li-est	môv'-ing	shep'-herd	wag'-ging

Questions:—1. Where was the shepherd's cottage? Who lived in it? 2. Why did the shepherd take down his staff one evening? 3. What did his son propose? 4. Why had the boy no fear? What went with him? 5. What did he get at the village? 6. What continued to fall? 7. What did Shag suddenly do? What did the boy say to him? 8. What happened? 9. How long did his parents watch for his return? What had his father placed in the window? 10. What did his mother hope? 11. What was heard about midnight? 12. What did the mother exclaim? What did the father notice? 13. What did he at once do?

Spellings and Meanings:

Ab'-sence, being away
Con-cealed', hidden.
Con-sent'-ed, agreed, said Yes.
Glen, valley.
Heed'-less of, not minding
Ob'-sti-nate, self-willed.
Per'-ished, died; lost his life.
Prec'-i-pice, steep rock.
Snow'-wreath, mound or heap of snow drifted by the wind.

Summary:—A shepherd boy took with him his father's dog, and went one evening through the snow for medicine for his sick mother. Late at night the dog returned alone, with the medicine in a handkerchief tied round his neck.

Exercise—Use the words, command, plant, present, sail, sound, rest, cough, spring, mark, as Nouns, and use as Verbs; as, The captain gave his men a command. I command [illegible]

STORY OF A SCOTTISH SHEPHERD BOY.—II.

1. Alone in her mountain dwelling, the poor mother lay watching and waiting. As the snow and the wind beat around the cottage, she sometimes feared that her husband too might perish in the glen.

2. She felt that the lives of both her husband and her son depended on the sagacity of the dog. But she knew that God could guide the dumb creature's footsteps, and she fervently prayed to Him in her time of need.

3. Shag led the way down the glen; and when they were at some distance from the cottage, he suddenly turned down a path which led to the bottom of the crag over which the poor boy had fallen.

4. The descent was steep and dangerous and the shepherd was often obliged to support himself by laying hold of the branches of some small birch-trees which grew among the rocks.

5. Happily the snow had ceased to fall, the clouds had passed away, and the moon shone bright and clear in the sky. At last the shepherd stood near the bottom. He hallooed, he strained his eyes, but he could neither see nor hear anything.

6. Shag was making his way down an almost upright cliff, and the shepherd resolved at all risks to follow him. After getting to the bottom, Shag began whining and scratching at something lying among the snow. The father found it was what seemed to be the dead body of his son. But he was not dead; he was only in a stupor.

7. Lifting him up in his arms, he wrapped his plaid around him, and strapped him across his shoulders. With great labour he climbed the steep ascent. He made his way as best he could to the cottage, and at last reached it with his heavy burden.

8. The poor boy was laid on his mother's bed, and after great exertions they aroused him from his death-like sleep. He was much bruised, but was not otherwise hurt.

9. When he fell, Shag had made his way down

to him; and the brave boy had used what little strength he had left to tie the doctor's packet to the dog's neck and send him home.

10. Shag lived at the cottage in the glen till he grew old and gray. He was loved and cared for till the day of his death, for his services on that terrible winter night.

New Words in this Lesson —

a-roused′	dăn′-ger-ous	foot′-steps	oth′-er-wise
as-cent′	de-scent′	hal-looed′	plaid
bruised	ex-er′-tions	hap′-pi-ly	ser′-vic-es
cliff	fer′-vent-ly	o-bliged′	strained

Questions — 1. What did the mother sometimes fear? 2. What thought comforted her? 3. What did Shag do at some distance from the cottage? 4. What was the shepherd often obliged to do? 5. What chance had taken place in the meantime? 6. Where was Shag going? What did the shepherd resolve to do? What did he find? In what state? 7. How did he convey him to the cottage? 8. Where was he placed? What did his parents succeed in doing? 9. What had he been able to do after falling? 10. Why was Shag loved and cared for?

Spellings and Meanings —

A-roused′, awaked.
As-cent′, way upwards.
Bruised, wounded.
Crag, steep rock [words.
De-scent′, way down-
Ex-er′-tions, efforts
Fer′-vent-ly, with great earnestness.
Hal-looed′, shouted.
Plaid, woollen cloth
Sa-ga′-ci-ty, good sense
Strained, looked eagerly
Stu′-por, a swoon, a faint
Whin-ing, crying

Summary — The shepherd, led by his dog, found his son lying in a stupor at the foot of a precipice over which he had fallen. The boy soon recovered from the effects of his fall. The dog was cared for till the day of his death.

Exercise — Give the past tense of the Verbs, **write, stand, walk, eat, live, spread, cry, save**; as, **write, wrote.**

LITTLE JIM.

1. The cottage was a thatched one,
The outside old and mean:
Yet everything within that cot
Was wondrous neat and clean.

2. The night was dark and stormy,
The wind was howling wild;
A patient mother knelt beside
The deathbed of her child:

3. A little worn-out creature—
His once bright eyes grown dim;
He was a collier's only child—
They called him little Jim.

4. And oh, to see the briny tears
Fast hurrying down her cheek,
As she offered up a prayer in thought;—
She was afraid to speak,

5. Lest she might waken one she loved
Far better than her life;
For there was all a mother's love
In that poor collier's wife.

6. With hands uplifted, see, she kneels
Beside the suff'rer's bed;
And prays that He will spare her boy
And take herself instead!

7. She gets her answer from the child;
Soft fell these words from him:—
"Mother, the angels do so smile,
And beckon little Jim!

8. "I have no pain, dear mother, now;
But oh, I am so dry!
Just moisten poor Jim's lips again;
And, mother, don't you cry."

9. With gentle, trembling haste she held
The tea-cup to his lips;
He smiled, to thank her, as he took
Three tiny little sips.

10. "Tell father, when he comes from work,
I said good-night to him;
And, mother, now I'll go to sleep"—
Alas! poor little Jim!

11. She saw that he was dying—
The child she loved so dear
Had uttered the last words that she
Might ever hope to hear.

12. The cottage door was opened,
The collier's step was heard;
The mother and the father met,
Yet neither spoke a word!

13. He knew that all was over—
He knew his child was dead;
He took the candle in his hand,
And walked towards the bed.

14. His quivering lips gave token
Of grief he'd ill control;
And soon his wife beside him—
The stricken couple kneel!

15. With hearts bowed down with sadness,
They humbly ask of Him,
In heaven once more to meet again
Their own poor little Jim.

Fanny Forrester.

New Words in this Lesson:—

ān'-gels	howl'-ing	moist'-en	thatched
beck'-on	hum'-bly	quiv'-er-ing	up-lift'-ed
brin'-y	hur'-ry-ing	strick'-en	ut-tered

Spellings and Meanings:—

Beck'-on, call by a wave of the hand.
Brin'-y, salt; like sea-water.
Coll'-ier, one who works in a coal mine.
Con-ceal', hide.
Fain, gladly.
He'd, he would
In thought, in the mind without speaking
Moist'-en, make wet
Pa'-tient, bearing much without a grumble
Quiv'-er-ing, shaking, trembling with strong feeling
Spare, allow to live
Strick'-en, [illegible] with grief.
Thatched, with a straw roof.
To-ken, sign, or proof
Ut'-tered, spoken
Won-drous, [illegible] the moon shone just [illegible]

Summary: One night a mother knelt by her dying child. She prayed God to take her, and spare him. Just after he had died his father came home and together the parents knelt and prayed that they might meet their child in heaven.

Exercise: *Make Adjectives out of the following Nouns*, **wood, cloud, wind, heart, health, father, love; as, wood, woody.**

SPEEDY AND STEADY.

1. "Well, Amy, how are you getting on with your napkin?" cried Lizzy, whose swift fingers seemed to fly over her work.

2. "Not very fast," replied quiet little Amy, without raising her eyes; "I have almost finished one side."

3. "One side!" said Lizzy, with a laugh which was neither pleasant nor kind; "why, we both began hemming our napkins at the same time, and I'm now at the *fourth* side of mine!"

4. "I know that I am slow," sighed Amy.

"You may well say that!" cried Lizzy.

"But I'll try to be steady, and to do my best," said the little girl, as she threaded her tiny needle, and went on with her work.

5. "As I sew so fast," cried Lizzy, "I am sure to have finished my napkin long before the bell rings for dinner. I'll just run for a minute to the garden, to see if the roses are out;"—so, tossing down her work on a chair, Lizzy flew off.

6. Amy longed for the fresh air and the flowers, but her work must first be done. Steadily she laid down her broad hem, and had finished the second side of her napkin before her sister came back.

7. "Ah, you plodding little thing!" cried Lizzy; "you will never get up to me. I'll have time to go to my room and put my new picture on the wall."

8. Off went gay little Lizzy. Amy went on with her work. Before her sister again entered the room, the third side of her napkin was hemmed.

9. "Had you not better finish your sewing?" said Amy. "It must be near dinner-time now."

"Oh! I can finish it in two minutes; only I want to look at that story, which Tom told us was so amusing."

10. "But if you are late?"

"No fear of that!" cried Lizzy; "no one is so likely to be late as a slow little creature like you!"

11. Poor Amy made no reply; stitch after stitch, stitch after stitch, quietly she worked on. Lizzy was soon so deep in her story that she forgot all about her work, till startled by the sound of the bell.

12. "Can it be dinner-time?" she cried, "and my napkin not hemmed! And yours—"

"It is just finished," said Amy, as she quietly folded it up.

13. "'Tis just like 'The Hare and the Tortoise,'"

said Lizzy, who, though pert and vain, had enough of sense to take a lesson.

She had been reading in one of her books the story of "The Hare and the Tortoise," and she saw that the quiet steady worker wins in the end.

14. A hare, very proud of her speed, once ran a race with a tortoise. In a moment the hare got far before her rival, who, with his heavy shell on his back, could move only at a very slow pace.

15. "Ha! ha!" laughed the hare, as she stopped half-way to glance back at the tortoise creeping on far behind; "if you don't ply your short legs a little faster, my friend, I'll be half over the country before you reach the end of the field."

16. The tortoise said not a word, but toiled on.

"Really," said the saucy hare, "if I were to hop on three legs I should get on much faster than you do! I think that I'll take a short nap. I can soon overtake you."

17. So the hare lay down, and soon fell fast asleep. She heard not the little feet of the tortoise, as he came creeping up to the place; she saw him not as he went steadily on, never stopping to look behind.

18. Presently the hare awoke, and sprang up, ready to dart on like the wind. "Where is the tortoise?" cried she.

"Here," cried a voice from the end of the field; "slow and steady has won the race!"

New Words in this Lesson:—

hemmed	nap-kin	plod'-ding	sighed	toiled
Liz'-zy	pert	ri'-val	thread'-ed	tor'-toise

Questions:—1. 2 What work were the two sisters doing? 3 Who was further on? 4. What did Lizzy say she would try to be? 5 What did Lizzy think she would do? 6 What had Amy promised before her sister came back? 7 What did Lizzy think Amy had time to do? 8 Before she came back. 9 How far had Amy got on? 10 Did Lizzy then take up her work? What then? How far had Amy got on? 11 What beautiful new fable did she was reading? 12. How far on was Amy? In 13 What kind of work was Lizzy's work? 13 What did she say they were like? 14 With whom did Lizzy once run a race? 15 What did she say as she glanced back? 16 What did she continue say? What did she must do to fill up the time? 17 What did the tortoise do in the meantime? 18. What did the hare cry out when she awoke? What was the answer?

Spellings and Meanings:—

A-muz'-ing, full of fun.
A short nap, a little sleep.
Fin'-ished, ended, done.
Nap'-kin, handkerchief
Pace, rate of walking
Part, forward.
Ri'-val, the one she was striving with.
Toiled, worked; laboured.

Summary:—Amy and Lizzy had each a napkin to hem. Amy was so glad that her sister laughed at her, and stopped her work to look at the roses in the garden, to put in a new picture, and also to look at a story. But Amy worked quietly on, and finished her work first.—A hare once ran a race with a tortoise. She felt so sure of winning, that she lay down to sleep. The tortoise went on, never stopping to look behind; and so, slow and steady, he won the race.

THE TWO PORTRAITS.

1. Prince Leopold, the youngest son of Queen Victoria, in a speech made at Liverpool, once said —

"I think that if children are taught early to see the difference between what dirt and waste and selfishness make of a poor man's dinner, and what thrift and care and cleanliness can make of it at the same cost, we shall be taking in flank our great enemy *drink*, — the only terrible enemy that England has to fear."

2. A teacher one day, after reading to his scholars this part of the Prince's speech, said to them — "Children, did you ever hear the story of the 'Two Portraits'? Let me tell it to you.

3. "A painter once wanted to paint a face that would do to represent 'Innocence.' One day, as he was passing through the streets, he saw a little child whose face was the brightest, the sweetest, and the most beautiful he had ever seen.

4. "He said to himself, 'That is just what I want.' The child's parents allowed him to paint a portrait of the head and face of their little boy. When he had finished the picture, he hung it up in his study. Everybody admired it.

5. "The sweet, gentle look of that face seemed a perfect picture of innocence. He often gazed upon it when he was disturbed or troubled, and it seemed to calm him and do him good.

6. "The painter afterwards said that he would like to paint another head to be the very opposite of this — as unlike it in everything as possible.

Then he would have the two portraits to hang side by side, — the one a picture of Innocence, the other a picture of Guilt.

7. "Many years passed away before he found any face that would do for the second picture. At length he was one day visiting a prison, where he saw the most dreadful-looking man he had ever seen. His face had a fierce, haggard look, with glaring eyes, and cheeks deeply marked by crime.

8. "The moment he saw the man he said to himself, 'This will do for my second picture.' He painted a picture of that dreadful face, to hang beside that of the beautiful child, which had been in his study so long. When the two pictures were hung side by side, oh, how great was the contrast between them! The one looked like the face of an angel child, and the other like the face of a fiend.

9. "But when the painter came to know the history of the prisoner, you may judge what his surprise was when he found that this man was the very same person whose face, when a child, he had painted for a picture of 'Innocence.'

10. "What had made this great change? One little word of five letters, — *drink*. Step by step after the little boy had left school he had been led into temptation. Step by step drink had led him into crime; and now he was an inmate of a prison.

11. "Oh," said the teacher, "who can tell what may in a few years happen to any of us! For your own good, take the step which the noble son of Queen Victoria points to. Never touch strong drink, for then only will you be safe. Remember that all

drunkards were once innocent children, and that some of the children of to-day may be the drunkards of the future.

12. "Though it may not lead us into crime, yet the use of strong drink may destroy our own happiness and the happiness of all around us. There is an old fable of a man who put a serpent nearly dead with cold into his bosom to warm it, and the creature, when it had revived, almost stung the man to death. So it is with strong drink: though harmless at first, 'at the last it biteth like a serpent, and stingeth like an adder.'

13. "Will you form yourselves into a Band of Hope? And let us call it, in honour of the Queen's son, 'The Royal Band of Hope.' Tell your parents what I have been saying, and get their consent."

14. The children did so. Parents and friends were delighted to encourage a School Band of Hope, and the teacher wrote this form of membership on the black-board for the children to copy:—

The Royal Band of Hope Union.

For my own good, and to avoid being led into temptation when I grow up, I hereby declare myself a Member of the Royal Band of Hope Union.

With my parents' consent, I promise not to use intoxicating liquors, and to do all that I can to induce my companions to act in the same way.

Name .....

School .....

Town and Date .....

15. The parents rejoiced when their children had become members of the Royal Band of Hope Union. They believed that this act of school-life would be a comfort to them in the future lives of their children, and a pleasure to the children to look back upon when they began the battle of life for themselves.

New Words in this Lesson:—

ad'-der	Guilt	Le'-o-pold	re-joiced'
clean'-li-ness	hag'-gard	liq'-uors	rep-re-sent'
crime	in-duce'	Liv'-er-pool	self'-ish-ness
fiend	in'-mate	mem'-ber-ship	ser'-pent
flank	In'-no-cence	op'-po-site	temp-tā'-tion
glār'-ing	in-tox'-i-cāt-ing	por'-traits	Un'-ion

Questions.—1. Who was Prince Leopold? What did he once say? 2. What story did a teacher tell? 3. Of what did a painter want to paint a picture? 4. Where did he get the child's portrait? 5. What effect had it on his mind? 6. What other picture did the painter want to paint? 7. Where did he find a dreadful looking man? 8. What did he do with the second picture? 9. What did he discover? 10. What had caused the change? 11. What did the teacher ask the children not to do? 12. What fable did he tell them? 13. What did he propose to form? What was it to be called? Why? 14. What did parents and friends do? What reason did the pledge give for joining the Band of Hope? 15. Why did the parents rejoice?

Spellings and Meanings:—

Ad'-der, kind of serpent
A-vaid', keep from
Con-trast', unlikeness
Crime, sin; the breaking of the laws
Fiend, devil
Flank, the side
Fu'-ture, time to come
Glār'-ing, fierce-looking
Guilt, a person marked with crime; [cyed
Hag'-gard, worn; hollow-
In-duce', persuade
In'-mate, dweller
In'-no-cence, a person without sin; purity
In-tox'-i-cāt-ing, which make drunk
Paint'-er, artist; painter of pictures
Por'-trait, likeness
Prince Le'-o-pold, also called the Duke of Albany
Rep-re-sent', show
Re-vived', recovered its
Thrift, saving [powers

Summary.—Prince Leopold in a speech at Liverpool spoke of drink as the only terrible enemy that England has to fear. A teacher read the speech to his scholars and, by the story of "The Two Portraits," showed how through it an innocent child may become a guilty man. With their parents' consent the children formed a Band of Hope, which they called the Royal Band of Hope Union.

Exercise.—Write out the form of membership on page 56.

THE AMBITIOUS BOY.

1. "I never knew before, Cecil, that you were so fond of drawing," said Aunt Sophia, as she looked over the shoulder of her nephew, who was busy with his pencil. "You really have made great progress."

2. "I need to do so," cried Cecil, "if I am to carry off the prize for drawing, as I am resolved to do this term."

3. "I should have thought," said the aunt, "that you had little chance against Lee. He is an artist's son, and has used the pencil, one might almost say, from his cradle."

4. "That will double the pleasure of beating him!" cried Cecil, dashing the bough of a tree into his picture, as if he meant what he said. "I'm working now at this four hours a day; he never draws more than two."

5. "You are not neglecting your Latin for it, I hope? You have had the Latin prize every term for these three years past," said Aunt Sophia.

6. "Yes," replied Cecil, with a proud smile; "there is no boy in our class can match me in that, though Russell is now working hard. But I am not content with *one* prize. I cannot rest till I have won the paint-box for drawing, of which Tom Lee makes so sure. It would be grand to beat the son of an artist on his own ground!"

7. "Take care," said his aunt, gently laying her hand on his shoulder, "that you do not lose the Latin prize, in trying for that which you are not likely to gain. Remember the fable of the dog that dropped the substance, in catching at the shadow."—"Tell me the story," said Cecil.

8. "As a dog was crossing a brook with a bone in his mouth, he saw his own image in the clear water, and mistook it for another dog carrying another bone. Not content with what he himself had, the greedy creature snatched at the prize which he saw below.

9. "In doing so, he dropped the real bone, which fell into the brook and was lost!—Those who grasp at too much often lose what they have."

10. On the evening of the day on which the names of the prize-winners were read out, Cecil came home from school gloomy and grave. His looks told his

aunt enough to make her spare him the pain of questions; but his little sister Rosy was not so thoughtful.

11. "O Cecil," she cried, running eagerly up to him, "tell me, are you to get the two prizes?"

"No," said Cecil, with a growl.

"Only one," cried the child in a sorrowful tone.

"*Not one*," muttered the boy. "I was so busy trying to beat Lee, that I could not hold my ground against Russell."

12. Cecil flung himself on a chair, in so angry a mood that even Rosy did not dare to question him further. Their aunt silently hoped that the lesson might prove worth the pain which it cost, and that the ambitious boy might not again need to be reminded of the dog in the fable.

New Words in this Lesson:—

am-bi'-tious	Lat'-in	prog'-ress	So-phi'-a
art'-ist	mis-took'	Rus-sell	sor'-row-ful
Ce'-cil	mut'-tered	shad'-ow	sub'-stance
greed'-y	ne-glect'-ing	shoul'-der	term
im'-age	neph'-ew	snatched	win'-ners

Questions:—1. What did Aunt Sophia say to Cecil? 2. Why was he working so hard? 3. Why did his aunt think that he had little chance? 4. What effect had this on Cecil? 5. What prize had Cecil had several times? 7. Of what did his aunt remind him? 8. What did a dog see when crossing a brook? What did he do? 9. With what result? 10. In what state did Cecil come home on prize day? What did his aunt do? 11. What did Rosy ask, and how did Cecil reply? 12. What did his aunt hope that the lesson might prove?

Spellings and Meanings:—

Am-bi'-tious, anxious to beat others.
Art'-ist, painter of pictures.
Cra'-dle, birth.
Fa'-ble, story with a moral.
Greed'-y, eager to get more.
Im'-age, likeness
Lat-in, a language.
Mut'-tered, said in a grumbling voice
Ne-glect-ing, overlooking.
Neph'-ew, brother's or sister's son.
Prŏg'-ress, advance, improvement.
Shad-ow, appearance; likeness.
Spare, not give.
Sub-stance, real thing.
Term, part of a school year

Summary:—Cecil had won the Latin prize several times. He determined to win the drawing prize too. His aunt warned him to take care, else he might lose both. He would not be advised, and so he got neither of them. Like the dog in the fable, he grasped at the shadow and lost the substance.

Exercise:—*What parts of speech are the words in the Summary?*

PERSEVERE.

1 Drive the nail aright, boys,
Hit it on the head;
Strike with all your might, boys,
While the iron's red.

2. When you've work to do, boys,
Do it with a will;
They who reach the top, boys,
First must climb the hill.

3 Standing at the foot, boys,
Gazing at the sky,
How can you get up, boys,
If you never try?

4. Though you stumble oft, boys
Never be down-cast;
Try, and try again, boys,—
You'll succeed at last.

WHITTINGTON AND HIS CAT.—I.

1. In the days of King Edward the Third there lived in a small country village a little boy called Dick Whittington, whose father and mother died when he was very young. As he was not old enough to work, he was for a long time badly off, until a kind but poor old woman took pity on him and made her little cottage his home.

2. She always gave him good advice; and he became industrious and well-behaved, and was a great favourite in the village. When he was about fourteen years old, and had grown up to be a stout, good-looking lad, the old woman died, and he had to look out how to earn his own living.

3. Now Dick was a very intelligent boy, and fond of gaining knowledge by asking questions of everybody who could tell him anything useful. In this way he had heard much about the wonderful city of London; more, indeed, than was true, for the country folks were fond of

talking of it as a place where the streets were paved with gold, and where all the people were fine ladies and gentlemen.

4. Dick felt very curious to go to London and see it with his own eyes, hoping to so great and wealthy a place he should get on better than he could in a poor country village.

5. Accordingly, on a fine summer morning he boldly started on his journey, with very little money in his pocket, yet full of good spirits and hope. After he had walked six or seven hours, and felt very tired, a heavy waggon on its way to London overtook him.

6. Dick, without much ado, told the waggoner his plan, and begged that he might have a ride until his legs were sufficiently rested to let him walk again. This the man agreed to; and so, partly by riding and partly by walking side by side with the waggoner, Dick managed to reach the great city.

7. Though Dick's heart beat with joy on finding himself really in London, he was a little disappointed at the look of the streets and houses. He had fancied to himself a grander and richer sort of place than the city seemed to him at first sight to be.

8. After Dick had parted with the friendly waggoner, he had only enough of money left to pay for a scanty meal or two; and after wandering about for a whole day, expecting every moment to see the grand streets and the fine people he had heard of, he felt so weary and faint from fatigue and hunger, that he threw himself down on the steps of a doorway and cried himself asleep.

9. Dick remained all night in the open air; and next morning he got up and again wandered about the streets, eagerly looking for some kind face to encourage him to tell his story.

10. At last, looking about him, he saw a curious-looking knocker on the door of a large house, and he thought there could be no great harm if he gave a knock and waited to see who should appear. Now the house belonged to a rich merchant of the name of Fitzwarren.

11. The cook, a sour-looking, ill-tempered woman, opened the door. When she saw it was a poor worn-out-looking country lad who had disturbed her as she was making ready the dinner, she began to scold him roughly and to order him away.

12. Luckily for Dick, Mr. Fitzwarren came up to the door at this moment, and listened attentively to the poor lad's story; and so much was he pleased with his truthful looks and simple language, that the kind merchant ordered Dick to be taken into the house and cared for, until he should be able to get his living in some decent way.

13. Alice, the merchant's daughter, who was about the same age as Dick, had overheard all this, and well knowing the hard heart of the cook, did all she could to save Dick from her ill-will and harsh treatment. Her own kindness of heart made her feel for the distress of the poor orphan boy, and she tried her best to get her parents to care for him.

14. She succeeded so far that they agreed that Dick should remain in the house if he would make himself useful by assisting the cook, and in other ways. This, however, was not a very easy matter, for the cook never liked the boy from the first, and did everything she could to make him unhappy.

15. Amongst her other acts of cruelty, she made him sleep on a hard bed, placed in a garret sadly infested with rats and mice. Dick did not dare to tell his master; and, besides, he did not like to make mischief.

16. So he bore with his trouble as long as he could, but

resolved that when he had money enough he would buy himself a cat.

New Words in this Lesson:—

a-do′	fa-tigue′	in-fest′-ed	suf-fi′-cient-ly
at-ten′-tive-ly	Fitz-war′-ren	knowl′-edge	treat′-ment
dis-ap-point′-ed	gar′-ret	lan′-guage	wag′-gon-er
dis-turbed′	harsh	luck′-i-ly	wealth′-y
fan′-cied	in-dus′-tri-ous	rid′-ing	Whit′-ting-ton

Spellings and Meanings:—

A-do′, fuss; trouble.
Ad-vice′, directions; ——
Cu-ri-ous, [illegible]
De-cent, proper. [illegible]
Dis-ap-point′-ed, did not find things as he expected
Fan′-cied, thought.
Fa-tigue′, tiredness.
Gar′-ret, room next the roof of the house.
Harsh, rough.
In-dus′-tri-ous, hard-working.
In-fest′-ed, troubled.
In-tel′-li-gent, thoughtful.
Lan′-guage, words.
Lon′-don, the capital of the British Empire.
Scant′-y, not enough.
Treat′-ment, dealings.
Wealth′-y, rich.

WHITTINGTON AND HIS CAT.—II.

1. One day a poor woman passing by the door while he was cleaning it offered to sell him a cat; and when she heard his story, she let him have it for a penny.

2. Dick took his prize up to his garret, and faithfully carried her a part of his dinner every day. Now and then he would take pussy with him when he went out an errand, so that they soon became great friends.

3. Puss very soon got rid of Dick's nightly visitors, the rats and mice. Not only was she a good catcher of mice, but she was very clever and quick in learning many little tricks that her master taught her.

4. One day, when Dick was amusing himself with her, he was surprised by the appearance of his young mistress Alice, who became afterwards almost as fond of the cat as was Dick himself.

5. This young lady always remained the poor lad's friend; and this cheered him up under the very bad treatment

he received from the cook, who sometimes beat him severely. Alice was not beautiful in person, but, what was much better, she was very gentle, and had most agreeable manners.

6. It was no wonder, then, that Whittington, smarting under the ill-treatment of the cook, should regard his kind young mistress as nothing less than an angel. His respectful conduct and his love of truth interested Alice so much in him, that she asked her father to let one of the apprentices teach him to write—for he could already read very well; and the progress he made in writing, and in gaining further knowledge, was astonishing.

7. The merchant had now a ship ready to sail, and, as was his custom, he called his family and servants around him, and asked them all in turn to make a little venture, according to their wishes or abilities, under the particular charge of the captain.

8. All gave something but poor Whittington, who, having neither goods nor money, burst into tears from very vexation and shame. His kind friend Alice then whispered in his ear, "Send your cat, Dick;" and at once he produced pussy, his faithful friend and companion, and taking her on board, placed her in the hands of the captain.

9. His young mistress, however, took good care to make the cat's good qualities known to the captain, so that he might make the most of her for Dick's benefit.

10. After the loss of his cat, Dick felt rather sorrowful; and his enemy, the cook, added to his misery by her cruel treatment. She used to tease him constantly about his "fine venture," and the great fortune he was to make by it.

11. His young mistress, besides, was soon after absent from home on a visit; so that, poor fellow, he altogether lost heart, and could no longer bear to live in the same house with his tormentor.

12. In this gloomy state of mind, he resolved to leave Mr. Fitzwarren's house. He set out, accordingly, one morning very early, unobserved by any one, and wandered out of town.

13. Tired and wretched, he sat down on a large stone by the road-side. This stone, from his having rested himself upon it, is called Whittington's Stone to this day.

14. He presently sank into a sort of doze, from which he was roused by the sound of Bow bells, which began to ring a peal. As he listened to the bells they seemed to say to him:

"Turn again, Whittington,
Lord Mayor of London."

15. "Lord Mayor of London!" said he to himself. "Why, I would bear anything to be Lord Mayor of London. Well, I'll go back and bear any hardship, so that I be Lord Mayor of London at last." So he made the best of his way home again, and luckily got into the house without his absence having been noticed.

16. Dick now tried more than ever to make himself useful to his worthy master and his kind young mistress.

New Words in this Lesson.

a-bil'-i-ties	doze	may'-or	re-spect'-ful
a-gree'-a-ble	faith'-ful-ly	mis'-er-y	se-vere'-ly
ap-pren'-tic-es	for'-tune	peal	tor'-ment-or
as-ton'-ish-ing	hard'-ship	pro-duced'	vex-a'-tion
con-stant-ly	in'-ter-est-ed	qual'-i-ties	wretch'-ed

Spellings and Meanings:—

A-bil'-i-ties, what they were able.
A-gree'-a-ble, pleasing.
Ap-pren'-tic-es, youths learning a trade.
Ben'-e-fit, good done.
Cus'-tom, common way of (70)

Doze, sleepy state.
For'-tune, riches.
Hard'-ship, bad treatment.
Lord May'-or, chief magistrate of the city of London.

Mis'-er-y, unhappiness.
Peal, sound of a set of bells.
Prog'-ress, improvement.
Make a lit'-tle ven'-ture, send something in the hope of making a profit.

he received from the cook, who sometimes beat him severely. Alice was not beautiful in person, but, what was much better, she was very gentle, and had most agreeable manners.

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Prog-ress, improvement
Make a lit-tle ven-ture, send something in the hope of making a profit

WHITTINGTON AND HIS CAT.—III.

1. Mr. Fitzwarren's ship, the *Unicorn*, was unlucky enough to meet with much stormy weather. After being driven about by contrary winds for many days, land was at last seen on the African coast, at a place which abounded with wealth.

2. The people, who were chiefly copper-coloured, were hospitable, and much pleased to be visited by the ships of white men. The king, as soon as he heard of the arrival of the *Unicorn*, sent some of his great men to invite the captain and a few of his companions to visit his court, and to take dinner with him and his queen.

3. A grand dinner was provided for the occasion; and the king and his guests showed great good humour and kind feeling. But when the dishes were placed on the table, the white visitors were astonished at the appearance of rats and mice in great numbers, which came from their hiding-places and ate up nearly everything on the table in a very short time!

4. The king and the queen seemed to look on this as no uncommon event, although they felt quite ashamed that it should have taken place at this time. The captain, very much surprised, asked the king if he would not like to get quit of such troublesome animals.

5. "Oh! surely," said the king; "if any person would show me how to get rid of them, I would make him richer than any man in my kingdom." The captain, greatly rejoiced, said he had a creature on board his vessel which could destroy a whole army of rats and mice.

6. The king and the queen and the whole court listened to the captain's account of the cat's good qualities with wonder and delight, and were anxious to see her powers put to the proof. Puss was accordingly taken ashore in a basket.

7. Another dinner, which had been prepared and served up, was just about to be attacked in the same way as the former one, when puss sprung in a moment among the crowd of rats and mice, killing several, and making the rest run off in less than a minute.

8. Nothing could exceed the satisfaction caused by this event. The king and the queen and all the courtiers were unbounded in their admiration of pussy. At first the queen was frightened to touch an animal of such powers; but after a while, when she saw that pussy kept quiet, she ventured to stroke her on the back.

9. Pussy at once jumped on the queen's knee, and commenced purring, to her great delight. As might be expected, the captain was much pressed to leave this valuable cat with his black friends; and he, thinking that they would no doubt make a right royal return for so precious a gift, agreed to the request.

10. The queen's attachment to puss seemed to know no bounds, and she felt afraid lest any accident should happen to her—for fear that the rats and mice would return in larger numbers than ever. The captain comforted her greatly, however, by saying that pussy had a young family of kittens on board, which should also be presented at court.

11. Now the queen had a tender heart, and when she had heard from the captain all about Whittington, and of his great sorrow at parting with his cat, she felt that she could not take his favourite from him, especially when pussy's kittens were found to be quite able to frighten away the rats and mice.

12. So the cat was put back in her basket, and taken on board again. The king and queen were so grateful for the valuable services of pussy and her family, that they sent to Whittington, the owner of the wonderful cat, a

great many very valuable treasures; and besides, they bought from the captain his whole cargo.

New Words in this Lesson:—

ac-ci-dent	con-tra-ry	grate-ful	re-quest'
ad-mi-ra-tion	court-iers	hu-mour	sat-is-fac-tion
ap-pear-ance	e-spec-ial-ly	pow-ers	un-com-mon
at-tach-ment	e-vent'	pre-cious	u-ni-corn
car-go	ex-ceed'	pre-sent-ed	un-luck-y

Spellings and Meanings:—

Ac-ci-dent, sudden harm.
At-tach-ment, liking for.
Car-go, contents of ship.
Con-tra-ry, opposite.
Court, where a monarch stays.
Court-iers, those who wait on a monarch.
Fos-pi-ta-ble, kind, gave food.
Pre-cious, of great value.
Re-quest, [illegible]

WHITTINGTON AND HIS CAT.—IV.

1. The captain, having at last completed his business, took leave of his African friends, set sail for England, and, after a very long absence, safely arrived in the port of London. Mr Fitzwarren was much pleased at again seeing the captain, whom he had almost regarded as lost.

2. The captain gave an account of all that had happened to him and the ship; and, to the great delight of Alice, who was with her father, he told them of the success that had attended Whittington's venture.

3. Mr. Fitzwarren at once sent for Dick to hear of his good fortune, and told him that it was a just reward granted by Heaven for his patience under hard trials, and for his good conduct and industry.

4. When the boxes and bales with the treasures sent by the African king and queen to the owner of the cat were displayed before the astonished youth, he burst into tears, and begged his master to take all, if he would but continue to be his friend. But the merchant would touch

none of it; he said it all belonged to Whittington, and to him alone.

5. Before the captain took his leave, he said to Dick playfully, "I have another present for you from the African queen;" and calling to a sailor below, he ordered him to bring up the basket, out of which leaped Mrs. Puss, to the great joy of her former master; and right happy was she to see him again, purring round him, and rubbing her head against his face when he took her up in his arms. For the rest of her days she continued to live with her grateful master.

6. Dick made a liberal and proper use of his wealth, rewarding all who had been in any way kind to him; nor did he even omit his old enemy the cook when bestowing his gifts, although she could never after look at him fair in the face, from a sense of shame.

7. Mr. Fitzwarren constantly refused Whittington's earnest wishes that he would take at least some of his great wealth; but he agreed to help him to manage his property until he should grow up. Under his prudent counsel, Whittington became a thriving merchant and a wise and good citizen.

8. Whittington deeply loved Alice, and tried to win her affection by doing all he could to please her. She had long admired his modest behaviour, and his patience under wrong, and now she was happy to think that he had attained to what he had so much desired.

9. The kind merchant, her father, soon saw that they had a strong affection for each other, and on Whittington coming of age the marriage was fixed, to the great delight both of Whittington and Alice.

10. Whittington rose in position every year, and was highly respected. He became a member of Parliament, was knighted also, and was three times Lord Mayor of

London—thus fulfilling the prophecy uttered, as he fancied, by Bow bells.

11. When he was Lord Mayor for the third time, Sir Richard entertained the King and the Queen in such great style that the king was pleased to say, "Never prince had such a subject!" to which, it has been said, the Lord Mayor loyally replied, "Never subject had such a prince!"

12. Sir Richard Whittington supported a great number of poor people, and did many noble acts of charity, by some of which he is still kept in memory. He died, regretted by all, full of years and of honours, having lived about twenty years after the death of Alice his wife.

New Words in this Lesson:—

at-tained′	coun′-sel	mod′-est	proph′-e-cy
be-hāv′-iour	en-ter-tained′	o-mit′	pru′-dent
char′-i-ty	ful-fil′-ling	Par′-lia-ment	re-gret′-ted
cit′-i-zen	knight′-ed	po-si′-tion	Rich′-ard
com-plet′-ed	loy′-al-ly	prop′-er-ty	thriv′-ing

Spellings and Meanings:—

At-tained′, become the possessor of.
Be-stow′-ing, giving
Char′-i-ty, kindness to the poor.
Com′-ing of age, twenty-first birthday
Dis-played′, shown
Ful-fil′-ling, bringing to pass.
Grate′-ful, thankful
Knight′-ed, given the title of Sir.
Lib′-er-al, free.
Loy′-al-ly, faithful to his king
Mem′-ber of Par′-lia-ment, a person elected to represent others in the House of Commons.
Mem′-o-ry, mind.
Mrs.,
O-mit′, leave out.
Proph′-e-cy, something foretold.
Pru′-dent, wise; careful.
Thriv′-ing, getting on.
Treas′-ures, valuable things
Ven-ture, sending

GRUMBLE AND CHEERY.—I.

1. Grumble and Cheery were two millers who kept a large mill. Every one in the neighbouring village looked upon Cheery as the kindest, merriest fellow alive. But

Grumble was not in very good favour; for he always found fault with the times, the weather, the neighbours, the mill, Mrs. Grumble, or with his partner, Cheery.

2. Somehow or another accidents seemed to fall thicker on him than on any one else. Folks said, "If it were not for Cheery, bread and cheese would be scarce at the mill," for Grumble's sole delight seemed to be to stroll about with his hands in his pockets, doing nothing but grumble, grumble; grumble, while Cheery worked and sang as blithely as a lark.

3. One bright morning Cheery and Grumble set off to buy a horse. As they walked, they passed by a turn of the road where there was a small, narrow cave, in the chalky side of a hill, all overgrown with box-trees; and as they drew near it, two or three very shrill voices screamed out, "Let us out, master! let us out! let us out!" Grumble said, "Get out as you got in; who is to blame but yourselves?" But Cheery said, "Nay, Grumble; if we do not help one another, how shall we live?"

4. Then Cheery turned towards the mouth of the cave, and found that a great lump of chalk had rolled down close against it, so that no one could get either in or out. He set his shoulder well to work, and he called loudly to those inside, saying, "Push, push away, my fine fellows!" And after moving the great stone three or four times away it rolled, and left the mouth of the cave open.

5. Out from the cave walked three fat little old men, the queerest little fellows possible, with long hair, long noses, long chins, and very long hands. And as they came out, they danced and sprung about like young frogs. Then one said, "Stop! here's Master Cheery, who let us out. In return for his kindness I promise him that the horse he shall buy at market shall have the speed of the wind."

6. "And I say," said the second, "that the horse shall never tire under weight or work." And the third little old man promised that, after three years' service, the horse should run away with all the ill luck in the house. As he finished, the three little men scampered back into the cave as fast as they could, singing in chorus:—

"A smiling face and a ready hand
Outweigh the riches of all the land;
For the face gets fat while the hand doth toil,
Heedless of every one's chatter and coil."

7 Cheery laughed loud enough at the little men's promises; and Grumble muttered, "Ah! ah! promises are ready payment. 'Twas a pity they hadn't better thanks in their pockets."

8. On the two millers trudged to market. But when they got there, they found so many horses on sale that Cheery could not make up his mind which to buy; and Grumble did not help him, but managed to find some fault with every one of them.

9. After they had wandered about half the day, unable to make up their minds, an odd, grim-looking, little old man, who had been standing with his arms folded, and his back against the warm, sunny wall, cried out that his pony (as fat and as sleek as could be) was for sale; and more, too—that Cheery should have him at his own price.

10. Grumble said that the pony was much too fat for work—that he was sure he could not be sound—that he had a vicious eye—that his hind legs were clumsy. Here the pony gave him such a switch with his tail, that Grumble clapped his hands to his mouth, and held his tongue.

11. Cheery bought the pony, and paid twenty gold pieces down for him. So home they went, Grumble in a sad way, and Cheery better pleased with his purchase every step he took.

New Words in this Lesson —

chor'-us	man'-aged	pay'-ment	stroll
clum'-sy	mill'-ers	scam'-pered	trudged
coil	out-weigh'	sleek	vi'-cious

Spellings and Meanings:—

Blithely, merrily.	Here's, here is.	Stroll, walk idly about.
Chat'-ter, talk	Mill, mason. [bought.	Trudged, walked.
Coil, hustle: trouble.	Pur-chase, what he had	'Twas, it was.
Hadn't, had not.	Sleek, soft: glossy.	Vi'-cious, wicked.

GRUMBLE AND CHEERY.—II.

1. The next morning, when Cheery went to feed the pony in the manger, there lay the twenty gold pieces in the bin—the very same that Cheery had paid the day before!

2. From that day all went well at the mill. The flour was always the earliest in the market, and brought the highest price. There were more sacks on the pony's back than three horses could carry. Cheery bought a cart: and let him fill it as heavily as he would, the pony never slacked his pace, but trotted on, and seemed as fresh and as fat after a day's work as when he was first taken out of the stable.

3. In a year's time Cheery married a merry little wife, as lively and sprightly as himself; and things went on so very well that Grumble got worse-tempered than ever at having nothing to find fault with. Above all, he had the strongest dislike to the pony; for not long after he had been taken to the mill, Grumble tried to ride him, and the pony ducked him in the pond, dragged him through the briers, and soused him at last into a ditch

So Grumble for a long time brooded over this, but could not find an opportunity for his revenge.

4. After three years, as the little old man had declared, Cheery's affairs were so thriving that he and Grumble were nearly the head men of the parish, and they were both made overseers of the poor. Cheery was always for kindness to the poor old people, but Grumble was a harsh tyrant, and would never give them a bit more help than he could not avoid.

5. Grumble had never forgiven the pony; and when these millers got rich enough to have other horses, he took it into his head one night to run down to the stable and take the pony out, and kill him in some fold far away. He had thought often and often how to harm the pony, but all his plans had been baffled somehow or another. Sometimes people were in the way; at other times the pony was in the fields; then Cheery had the key of the stable.

6. But this night Grumble had the key himself; the night was rainy, and the pony was safely housed; and so down he went, creeping along till he reached the stable door. The instant he opened it, out rushed the same three little fat old men whom he and Cheery had met on their way to market, and who promised so much about the pony.

7. As soon as they saw Grumble, they set up a shout, and poked at him with their sticks. Then they danced and laughed, and they pinched and kicked him without mercy. Here they beat him—there they pushed him; and at last they bound him hand and foot with hay-bands. Then they untied the pony, placed Grumble on his back, and telling him he was all the "ill luck" of the house, bade the pony scamper round and round the world, and not stop until he was told.

8. Away went the pony, at a quick, uncomfortable, shaking trot, with Grumble tied on his back, and was soon out of sight. Then the three little men danced out at the roof of the stable, and all again was still.

9. In the morning Grumble could not be found; and as the pony was missing also, an old dame said she thought she had seen Grumble riding through the village the night before. Days passed, weeks passed, months passed, and sometimes a tale was spread in the village that the pony had been seen trotting through with Grumble on his back. But whenever this happened, something went wrong.

10. At one of Grumble's visits to the village, the milk at the dairy turned sour; at another visit, all the boys and girls were frightened by the bull; at a third visit, which was just before Christmas, no mistletoe could be found anywhere. In short, whenever anybody said he had seen Grumble, some ill-luck was found to have happened just at that very time; until at last, whenever things went wrong in the village, people said, "Grumble has been riding through to-day."

11. As for Cheery, after he had sorrowed for the loss of the pony, everything became gay, glad, and thriving with him; and his merry little wife, and his merry little children, made his home as happy as any one could wish.

Thus endeth the tale of Grumble and Cheery.

New Words in this Lesson:—

af-fairs'
baf'-fled
bri'-ers
heav'-i-ly
mis'-tle-toe
op-por-tu'-ni-ty
o'-ver-seers
par'-ish
re-ver'-ge
shak'-ing
slacked
sor'-rowed
soused
sprightly
ty'-rant
un-com'-fort-a-ble

Spellings and Meanings:—

Baf'-fled, checked.
Bin, corn chest.
Brood'-ed, thought
Made o'-ver-seers, given the care
Mis'-tle-toe, a climbing plant with white berries
Pace, stood
Re-venge', returning evil for evil
Soused, plunged
Sprightly, active
Ty'-rant, hard man, one who does not consider another's feelings

TWENTY RULES AND MAXIMS.

(Read—Write—Learn.)

1. Be polite in speaking. In asking for anything always begin or end with the word "please."

2. Be polite on the street. If you meet your teacher or clergyman, your master or mistress, always lift your cap as a mark of respect.

3. In walking along the footway or on the street always step aside for older people than yourself.

4. Be tidy in your dress. If it is clean and tidy, never mind though it is not rich or fine.

5. Be clean in your person. Clean hands and clean faces should be the rule everywhere. To be clean all over, from head to foot, is the best rule for health.

6. Obey promptly. Never require to be told twice to do a thing.

7. Do to others as you would have others do to you. This is the golden rule of life.

8. Never hurt any one's feelings. It is cruel to try to raise a laugh at any one.

9. Be gentle and kind to all. Never speak rudely. Never act rudely.

10. Never use an oath; and cry shame on those who indulge in foul talk. Do your best to banish bad language from the school and the street.

11. Have a place for everything, and put everything in its place.

12. Better be alone than in bad company.

13. Do what is right because it is right. Expect no reward for doing your duty.

14. Be helpful everywhere, and most of all at home.

15. Do everything at the right time. Master your work, or it will master you; and do even the least thing in the best way. Whatever is worth doing, is worth doing well.

16. Always speak the truth. Truth is brave. Lying is cowardly. Never let your word be doubted. A liar is not believed even when he speaks the truth.

17. Contentment is better than wealth. Contentment in a cottage is better than care in a palace.

18. Covet not; and be as careful of the property of others as you would be of your own.

19. "Honour thy father and thy mother." Always obey them cheerfully and at once.

20. "Love God with all thy heart; and thy neighbour as thyself."

BE KIND.

Be kind to thy father: for when thou wast young,
Who loved thee as fondly as he?
He caught the first accents that fell from thy tongue,
And joined in thine innocent glee.
Be kind to thy father: for now he is old,
His locks intermingled with gray;
His footsteps are feeble, once fearless and bold—
Thy father is passing away.

Be kind to thy mother: for, lo! on her brow
May traces of sorrow be seen:—
Oh, well may'st thou cherish and comfort her now,
For loving and kind hath she been.
Remember thy mother: for thee will she pray,
As long as God giveth her breath;
With accents of kindness, then, cheer her lone way,
E'en to the dark valley of death.

Be kind to thy brother: his heart will have dearth,
If the smile of thy love be withdrawn;
The flowers of feeling will fade at their birth,
If the dew of affection be gone.
Be kind to thy brother: wherever you are,
The love of a brother shall be
An ornament, purer and richer by far
Than pearls from the depths of the sea.

Be kind to thy sister: not many may know
The depth of true sisterly love;
The wealth of the ocean has fathoms below
The surface that sparkles above.
Thy kindness shall brighten those many sweet hours,
And blessings thy pathway to crown:
Affection shall weave thee a garland of flowers,
More precious than wealth or renown.

ADVICE TO BOYS.

1. Whatever you are, be brave, boys!
The liar's a coward and slave, boys;
Though clever at ruses,
And sharp at excuses,
He's a sneaking and pitiful knave, boys

2. Whatever you are, be frank, boys!
'Tis better than money and rank, boys:
Still cleave to the right,
Be lovers of light,
Be open, above board, and frank, boys

3. Whatever you are, be kind, boys!
Be gentle in manners and mind, boys:
The man gentle in mien,
Words, and temper, I ween,
Is the gentleman truly refined, boys.

4. But whatever you are be true, boys!
Be visible through and through, boys:
Leave to others the shamming,
The "greening" and "cramming,"
In fun and in earnest, be true, boys!

POETRY FOR RECITATION.*

LUCY GRAY.

One winter afternoon Lucy Gray took a lantern and went out to meet her mother as she returned from town. Her mother returned without her, and her parents spent the whole night in looking for her. Next morning they found by her footmarks, that she had slipped over the edge of a bridge into the stream, and had been carried away by the waters. It is said that the incident on which this poem is founded took place near Halifax, a town in Yorkshire.

Narrative 1. Oft | I had heard | of Lucy Gray: |
And, | when I crossed the wild, |
I chanced to see, | at break of day, |
The solitary child.

Pathos 2. No mate, | no comrade | Lucy knew; |
She dwelt | on a wide moor— |
The sweetest thing | that ever grew |
Beside a human door!

Moralising 3. You | yet | may spy | the fawn at play, |
The hare | upon the green; |
But the sweet face of Lucy Gray |
Will never more | be seen.

Narrative 4. "To-night | will be a stormy night—
You | to the town | must go;

* These pieces have been marked for expressive reading or for recitation by Dr Moxey, M.R.C.P., London, Lecturer on Elocution.
EXPLANATION: / rising inflection, \ falling inflection, | pause

Narrative. And | take a lantern, | child, | to light
Your mother | through the snow."

5. "That, | father, | will I gladly do! |
'Tis scarcely afternoon— |
Wonder. The minster clock | has just struck two, |
And | yonder | is the moon!"

Narrative. 6. At this | the father | raised his hook,
And snapped a fagot-band; |
He plied his work; | and Lucy | took
The lantern | in her hand.

Lucy. 7. Not blither | is the mountain roe: |
With many a wanton stroke
Her feet | disperse the powdery snow, |
That rises up | like smoke.

Narrative. 8. The storm came on | before its time: |
She wandered | up and down;
And | many a hill | did Lucy climb, |
But | never reached | the town!

Narrative. 9. The wretched parents | all that night |
Went shouting | far and wide; |
But | there was neither sound | nor sight |
To serve them | for a guide.

10. At | day-break | on a hill | they stood, |
That overlooked the moor; |
And | there | they saw | a bridge of wood, |
A furlong | from their door.

Narrative. 11. They | wept, | and, | turning homeward, | cried, |
"In heaven | we all shall meet!"— |
When | in the snow | the mother | spied
The print | of Lucy's feet.

Narrative. 12. Then, | downward | from the steep hill's edge, |
They tracked the foot marks small;
And | through the broken hawthorn hedge, |
And | by the long stone wall;

Continues. 13. And | then | an open field | they crossed— |
The marks | were still the same; |

Continued.

They tracked them on, | nor ever lost, |
And | to the bridge | they came.

14. They followed | from the snowy bank |
Those foot-marks, | one by one, |
Hopeless. Into the middle of the plank— |
And | further | there were none!—

Supernatural

15. Yet | some maintain that | to this day |
She is a living child:
That | you may see | sweet Lucy Gray!
Upon the lonesome wild.

Continued.

16 O'er rough | and smooth | she trips along, |
And never looks behind: |
And sings | a solitary song
That whistles | in the wind.

WORDSWORTH (1770–1850).

Blith'-er, happier
Com-rade, friend; companion
Dis-perse', scatter; throw about.
Fag-ot-band, band round a bundle of sticks
Fawn, young deer
Fur-long, Eight furlongs make a mile.
Hu'-man door, door of a house where people live
Its time, it was looked for
Lone'-some, lonely, dismal
Main-tain', say strongly; hold it true.
Min-ster, church.
O'er, over
Plied, kept at.
Roe, female deer.
Sol'-i-ta-ry, lonely
Spy, see.
Spied, saw.
The wild, a wild place.
'Tis, it is
Tracked, followed
Wan'-ton, playful, frisky

THE PET LAMB.

[The poem describes a little girl feeding her pet lamb, and tells us what she was supposed to say to the lamb when it walked after her and tried to break away from the place where it was fastened.]

Surprise

1. The day | was falling fast, | the birds | began to blink; |
I heard | a voice; | it said, | "Drink, | pretty creature, | drink!" |
And, | looking over the hedge, | before me | I espied |
A snow-white mountain lamb, | with a maiden | at its side.

Surprise

2 Nor | other sheep | were near | the lamb | was all alone, |
And, | by a shepherd's dog | was tethered | to a stone:
With one | knee | on the grass | did | the little maiden | kneel, |
While | to that mountain lamb | she gave | its evening meal.

Admiration

3. The lovely little maiden | was a child of beauty rare; |
I watched them | with delight,— | they were a lovely pair. |
Now, | with her empty can, | the maiden turned away:
But | ere ten yards were gone, | her footsteps | did she stay.

Tender remonstrance.

4. "What ails thee, | young one? | what? | Why pull so | at thy cord? |
Is it not well with thee? | well | both for bed | and board? |

Tender remonstrance.

Thy plot of grass is soft, | and green | as grass can be; |
Rest, | little young one, | rest; | what is't that ails thee?

5. "Rest, | little young one, | rest; | thou hast forgot the day |
When my father found thee | first | in places far away: |
Many flocks | were on the hills, | but | thou wert owned | by none; |
And | thy mother | from thy side | for evermore | was gone.

Tender remonstrance.

6. "He took thee | in his arms, | and | in pity | brought thee home: |
A blessed day | for thee! | then | whither | wouldst thou roam?"
A faithful nurse | thou hast; | the dam | that did thee yean
Upon the mountain-tops | no kinder | could have been.

Tender remonstrance.

7. "Thou know'st | that | twice a day | I have brought thee | in this | can |
Fresh water from the brook, | as clear as ever ran; |
And | twice in the day, | when the ground is wet with dew, |
I bring thee | draughts of milk, | warm milk it is | and new.

Tender remonstrance.

8. "Alas, | the mountain-tops, | that look so green | and fair!
I've heard of fearful winds | and darkness | that come there; |
The little brooks, | that seem | all pastime | and all play, |
When they are angry, | roar | like lions for their prey.

Tender remonstrance.

9. "Here | thou need'st not dread | the raven in the sky: |
Night and day | thou art safe,— | our cottage is hard by |
Why bleat so after me? | why pull so at thy chain?
Sleep; | and | at break of day | I will come to thee | again!"

WORDSWORTH.

Ails, is the matter with
Bleat, cry.
Blink, twinkle.
Board, food.
Dam, mother sheep.
Dew, moisture from the air.
Draughts, drinks.
E-spied', saw.
Is't, is it
I've, I have.
Know'st, knowest
Maid-en, girl.
Need'st, needest.
O'er, over.
Pas'-time, fun
Prey, food.
Ra-ven, a bird of prey.
Roam, wander
Slen-der, thin.
Teth'-ered, tied.
Yean, care for

THE HOMES OF ENGLAND.

[Here we have a pleasant description of the different kinds of homes to be met with in our land. As we read the lines, we feel that "be it ever so humble, there's no place like home."]

With patriotic admiration.

1. The stately homes of England! |
How beautiful they stand, |
Amidst their tall ancestral trees, |
O'er all the pleasant land! |
The deer | across their greensward | bound |
Through shade | and sunny gleam; |
And the swan | glides by them | with the sound |
Of some rejoicing stream.

Home affections and domestic love.

2. The merry homes of England! |
Around their hearths, | by night, |
What gladsome looks | of household love |
Meet | in the ruddy light! |
The blessed homes of England! |
Slow time.
How softly | on their bowers |
Is laid the holy quietness |
That breathes | from Sabbath hours!

Slow time.

3. The cottage homes of England! |
By thousands | on her plains, |

Medium time.

They are smiling | o'er the silvery brooks |
And round the hamlet fanes. |
Through glowing orchards | forth they peep, |
Each | from its nook of leaves:
And | fearless | there | the lowly sleeps, |
As the bird | beneath the eaves.

Louder, and with fervour.

4. The free, | fair | homes of England! |
Long, | long, | in hut | and hall, |
May hearts of native proof | be reared, |
To guard | each hallowed wall! |
Louder, and with fervour but slower.
And | green for ever | be the groves, |
And | bright | the flowery sod, |
Where | first | the child's glad spirit | loves
Its country | and its God!

MRS. HEMANS (1793-1835)

An-ces'-tral trees, trees planted by forefathers.
Bow'-ers, shady places under trees | of roof.
Eaves, overhanging part
Groves, small woods
Hal | lowed, holy
Ham'-let fanes, village churches.
Na'-tive proof, brave or strong
Nook, corner
O'er, over
Or'-chards, fruit-gardens.
Rud'-dy, bright red
State'-ly, very grand.

THE GRAVES OF A HOUSEHOLD.

[Brought up together, reared in one home and under the care of the same mother, the members of the family were led by duty or by pleasure into different paths. Then, dying far away from home, one found a grave in America, one beneath the ocean, one in Spain, and one in Italy.]

Joyously.

1. They grew | in beauty, | side by side, |
They filled | one home | with glee:— |
Mournfully.
Their graves | are severed | far and wide, |
By mount, | and stream, | and sea!

Descriptive

2. The same fond mother | bent | at night |
O'er each fair sleeping brow; |
Tender
She had each | folded | flower | in sight;— |
Where | are those dreamers | now?

Solemn

3 One, | 'midst the forests of the West, |
By a dark stream | is laid; |
The Indian | knows his place of rest, |
Far | in the cedar shade.

4. The sea, | the blue lone sea, | hath one; |
He lies | where pearls lie | deep: |
Loving
He was the loved of all, | yet | none |
O'er his low bed | may weep

Proudly

5 One sleeps | where southern vines are dressed |
Above the noble slain. |
He wrapped his colours | round his breast, |
On a blood-red field of Spain.

Softer and more tender

6. And one— | o'er her | the myrtle | showers
Its leaves, | by soft winds fanned. |
She faded | 'midst Italian flowers— |
The last | of that bright band.

Cheerfully and more rapidly

7 And, | parted thus, | they rest | who played |
Beneath the same green tree; |
Whose voices | mingled as they prayed |
Around one parent knee!

8. They | that with smiles | lit up the hall, |
And cheered with song | the hearth— |

Devout. Alas for lóve! | if thóu wert àll, |
And nought beyónd, | O Èarth!

MRS. HEMANS.

Blood-red field, battle-field.
Ce-dar, pine tree.
Fanned, blown upon.
Fold-ed flów-er, sleeping child.
Glee, mirth; joyousness.
'Midst, amidst.
Mín-gled, mixed.
Myr-tle, a plant of southern lands.
Nought, nothing
O'er, [illegible]
Sev-ered, separated.
Vines, grape plants.
West, [illegible]

BRUCE AND THE SPIDER.

[King Robert the Bruce of Scotland, in the days of his adversity, flung himself down in despair in a lonely cave. He had made up his mind to give up the struggle with England, when he watched a spider fail six times to climb its slender thread. But it made a seventh attempt, and succeeded. Bruce resolved also to make another effort; and he recovered his throne.]

Descriptive. 1. King Bruce of Scótland | flung himself dówn, |
In a lónely mood | to thínk; |
'Tis true | he was a mónarch, | and wore a crówn. |
But his heart | was beginning to sink.

Despondent. 2. For | he had been trying | to do a gréat déed. |
To make his péople glád; |
He had tried and tríed, | but couldn't succéed, |
And só | he became quite sád.

Despairing. 3. He flung himself down | in low despáir, |
As grieved | as man could be; |
And | after a while, | as he pondered there, |
"I'll give it all úp," | said he.

Interested. 4. Now | just at the moment | a spider dropped, |
With its silken cobweb clew, |
And the king | in the midst of his thinking | stopped |
To see | what the spider would do.

Curiously watchful. 5. 'Twas a long way up to the ceiling dome, |
And it hung | by a rópe so fíne, |
That | how it could get | to its cobweb home |
King Bruce could not divine.

Encouraged. 6. It soon began | to cling | and crawl |
Straight úp | with strong endéavour; |
But | down it came | with a slipping sprawl, |
As near to the ground | as ever.

Descriptive. 7. Up, | up it ran, | nor a second did stáy, |
To utter the least complaint, |
Till it fell still lower: | and there it lay, |
A little dízzy | and faint.

Descriptive. 8. Its head grew steady— | again it went, |
And travelled | a half yard higher : |
'Twas a delicate thread | it had to tread, |
And a road | where its feet would tire.

Descriptive. 9. Again it fell, | and swung below ; |
But again | it quickly mounted, |
Till | up | and down, | now fast, | now slow, |
Six brave attempts | were counted.

With pity 10. "Sure," | cried the king, | "that foolish thing |
Will strive | no more | to climb, |
When | it toils so hard | to reach and cling, |
And tumbles every time."

Interesting description. 11. But up the insect went | once more,—
Ah me ! | 'tis an anxious minute ; |
He's only a foot | from his cobweb door,—|
Oh, | say, | will he lose | or win it?

Interesting description. 12. Steadily, | steadily, | inch by inch, |
Higher and higher | he got, |
And | a bold little run | at the very last pinch |
Put him into | his native cot. |

Enthusiastically. 13. "Bravo ! | bravo !" | the king cried out : |
"All honour | to those who try !
The spider up there | defied despair? |
He conquered, | and why shouldn't I?"

Narrative. 14. And Bruce of Scotland | braced his mind, |
And | gossips tell the tale, |

Narrative. That he tried once more, | as he tried before, |
And that time | he did not fail.

Moral. 15. Pay goodly heed, | all ye who read, |
And beware of saying, | "I can't;" |
'Tis a cowardly word, | and apt to lead |
To idleness, | folly, | and want.

Moral. 16. Whenever you find | your heart | despair
Of doing | some goodly thing, |
Con over this strain, | try bravely again, |
And remember | the spider | and king.

E. Cook (b. 1818).

Arx-ious, uneasy.
Apt, likely.
Braced, nerved, strengthened.
Can't, cannot.
Ceiling dome, inner roof.
Clew, thread.
Cob-web, web or net of a spider.
Con, read.
Couldn't, could not.
De-fied', dared.
De-state, fate.
Di-vine', think.
Dis-may, grief.
De-spair', loss of hope.
En-deav-our, trying.
Faint, weak.
Gos-sips, story-tellers.
He's, he is.
I'll, I will.
Last pinch, end of his climbing.
Mood, state of mind.
Pon-dered, considered.
Sec-ond, moment.
Shouldn't, should not.
Sink, lose hope.
Strain, song.
'Tis, it is.
Toils, works.
Tread, walk upon.
'Twas, it was.
Ut-ter, say.

THE VILLAGE BLACKSMITH.

[The village blacksmith was a steady, hard working man, who did his duty faithfully, and attended to the worship of God. He is held up to us as an example worthy of our imitation.]

Descriptive. 1. Under a spreading chestnut-tree |
The village smithy | stands :
Quiet The smith, | a mighty man is he, |
Industrious. With large | and sinewy hands :
And the muscles | of his brawny arms |
Are strong | as iron bands.

Detailed. 2. His hair | is crisp, | and black, | and long; |
His face | is like the tan; |
His brow | is wet | with honest sweat.
He earns | whate'er he can: |
Approving. And looks | the whole world | in the face, |
For | he owes not | any man.

General. 3. Week in, | week out, | from morn till night, |
You can hear his bellows blow; |
You can hear him | swing | his heavy sledge, |
With measured beat | and slow. |
Like a sexton | ringing the village bell, |
When the evening sun is low.

Special. 4. And children, | coming home from school, |
Look in | at the open door; |
They love | to see the flaming forge, |
And hear | the bellows roar, |
And catch | the burning sparks | that fly
Like chaff | from a thrashing-floor.

Narrative 5. He goes on Sunday | to the church, |
Quiet and simple And sits | among his boys; |
He hears the parson | pray | and preach; |
He hears | his daughter's voice
Singing | in the village choir, |
And it makes his heart rejoice.

Pathetic. 6. It sounds to him | like her mother's voice
Singing in Paradise! |
He needs must think of her | once more, |
How | in the grave | she lies; |

And | with his hard, | rough hand | he wipes |
A tear | out of his eyes.

Conclusion 7. Toiling, | rejoicing, | sorrowing. |
Onward | through life | he goes: |
Each morning | sees some task begun, |
Each evening | sees its close; |
Something attempted, | something done, |
That earns | a night's repose.

Moral. 8. Thanks, | thanks to thee, | my worthy friend, |
For the lesson | thou hast taught! |
Thus | at the flaming forge of life |
Our fortunes | must be wrought; |
Thus | on its sounding anvil | shaped
Each burning deed | and thought.

LONGFELLOW (1807-1882).

Brawn'-y, powerful.
Choir, band of singers.
Forge, smithy fire.
Like the tan, brown like tan for tanning hides.
Mus'-cle, fleshy fibres.
Par'-a-dise, heaven.
Re-pose', rest.
Sex'-ton, gravedigger
Shaped, must be shaped.
Sin'-ew-y full of sinews, strong.
Sledge, sledge-hammer
Thrash'-ing-floor, place where wheat is threshed.

AFTER BLENHEIM.

Old Kaspar, whose father's house had been burned by the English after Blenheim, talks with his grandchildren about the "famous victory." His grandson has found a skull beside the rivulet, and that leads to the conversation. The old man cannot tell what they fought about, or what good came of the fight; but he remembers the shocking sight of the field covered with thousands of dead bodies rotting in the sun, and is sure that it was a "famous victory." The Battle of Blenheim was fought at Blenheim, in Bavaria, between the English and the French, 1704. The French were defeated.

Quiet description 1. It was a summer evening,
Old Kaspar's work was done,

And he | before his cottage door |
Was sitting | in the sun ; |
And by him | sported | on the green |
His little grandchild, | Wilhelmine.

Interest awakened

2. She saw | her brother Peterkin |
Roll something | large and round, |
Which he | beside the rivulet |
In playing there | had found :
He came to ask | what he had found, |
That was so large, | and smooth, | and round.

Expectant.

3. Old Kaspar took it from the boy, |
Who stood | expectant | by ; |
And then | the old man shook his head, |
And | with a natural sigh— |

"'Tis some poor fellow's skull," | said he,
"Who fell | in the great victory.

4. "I found them in the garden, |
For there's many here about : |
And often, | when I go to plough, |
The ploughshare turns them out :
For | many a thousand men," | said he, |
"Were slain | in that great victory."

5. "Now tell us | what 'twas all about," |
Young Peterkin, | he cries : |
And little Wilhelmine | looks up |
With wonder-waiting eyes : |
"Now tell us | all about the war, |
And what | they fought each other | for."

Animation.

6. "It was the English," | Kaspar cried, |
"Who put the French to rout ; |
But | what they killed each other for, |
I could not well make out : |
But everybody said," | quoth he, |
"That | 'twas a famous victory.

Sad retrospection.

7. "My father | lived at Blenheim then, |
Yon little stream hard by. |
They burned his dwelling | to the ground, |
And he | was forced to fly : |
So | with his wife and child | he fled ; |
Nor had he where | to rest his head.

8. "With fire and sword | the country round |
Was wasted | far and wide, |

And | many a tender mother | then |
And new-born baby died:
Attempted explanation But things like that, | you know, | must be |
At every famous victory.

Ghastly scene. 9. "They say | it was a shocking sight |
After | the field was won; |
For | many thousand bodies | there |
Lay rotting | in the sun: |
Attempted justification But things like that, | you know, | must be |
After a famous victory.

10. "Great praise | the Duke of Marlbro' won, |
And our good Prince Eugene."— |
Interrogating and disappointed "Why, | 'twas a very wicked thing!" |
Said little Wilhelmine.— |
Attempted explanation. "Nay, | nay, | my little girl," | quoth he, |
"It was | a famous victory;

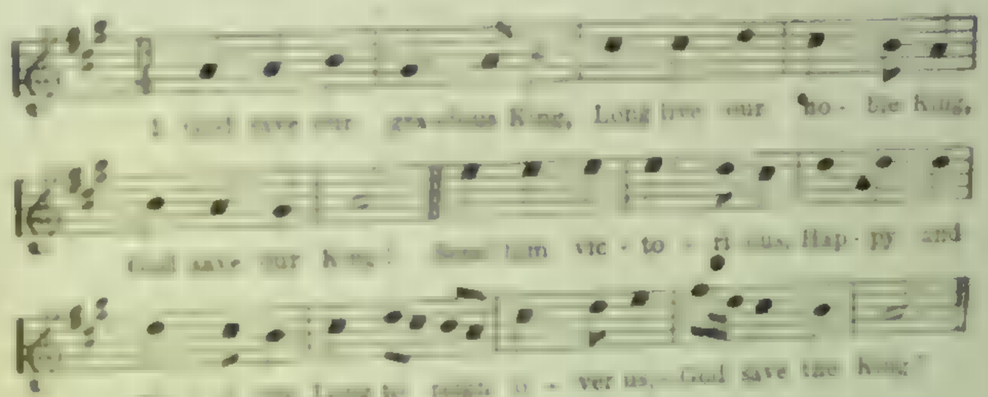
11. "And everybody praised the Duke, |
Who such a fight did win."— |
Impatient interruption. "But what good | came of it at last?" |
Quoth little Peterkin.— |
Puzzled reply. "Why, | that | I cannot tell," | said he; |
"But | 'twas a famous victory."

SOUTHEY (1774-1843).

Blen-heim, in Bavaria.
Duke of Marl-bor-ough, a great English general.
Ex-pec-tant, waiting for an answer.
Fa-mous, noted; great
Man-y a thou-sand, 30,000 were either killed or wounded. [feeling
Nat-u-ral, caused by deep
Old Kas-par, a Bavarian whose father had lived near the battle-field
Plough-share, blade or cutting part of plough
Prince Eu-gene', Prince of Savoy, a great general.
Quoth, said.
Riv-u-let, small stream
Rot-ting, decaying
Rout, defeat; running away.
Skull, the bony case of
Sport-ed, played.
There's, there is.
'Twas, it was.
Vic-to-ry, battle won.
Wast-ed, destroyed [laid bare
Won-der, wait-ing, expecting

SCHOOL SONGS.

GOD SAVE THE KING!



2.
Thy choicest gifts in store
On him be pleased to pour,
Long may he reign!
May he defend our laws,
And ever give us cause
To sing with heart and voice,—
"God save the King!"

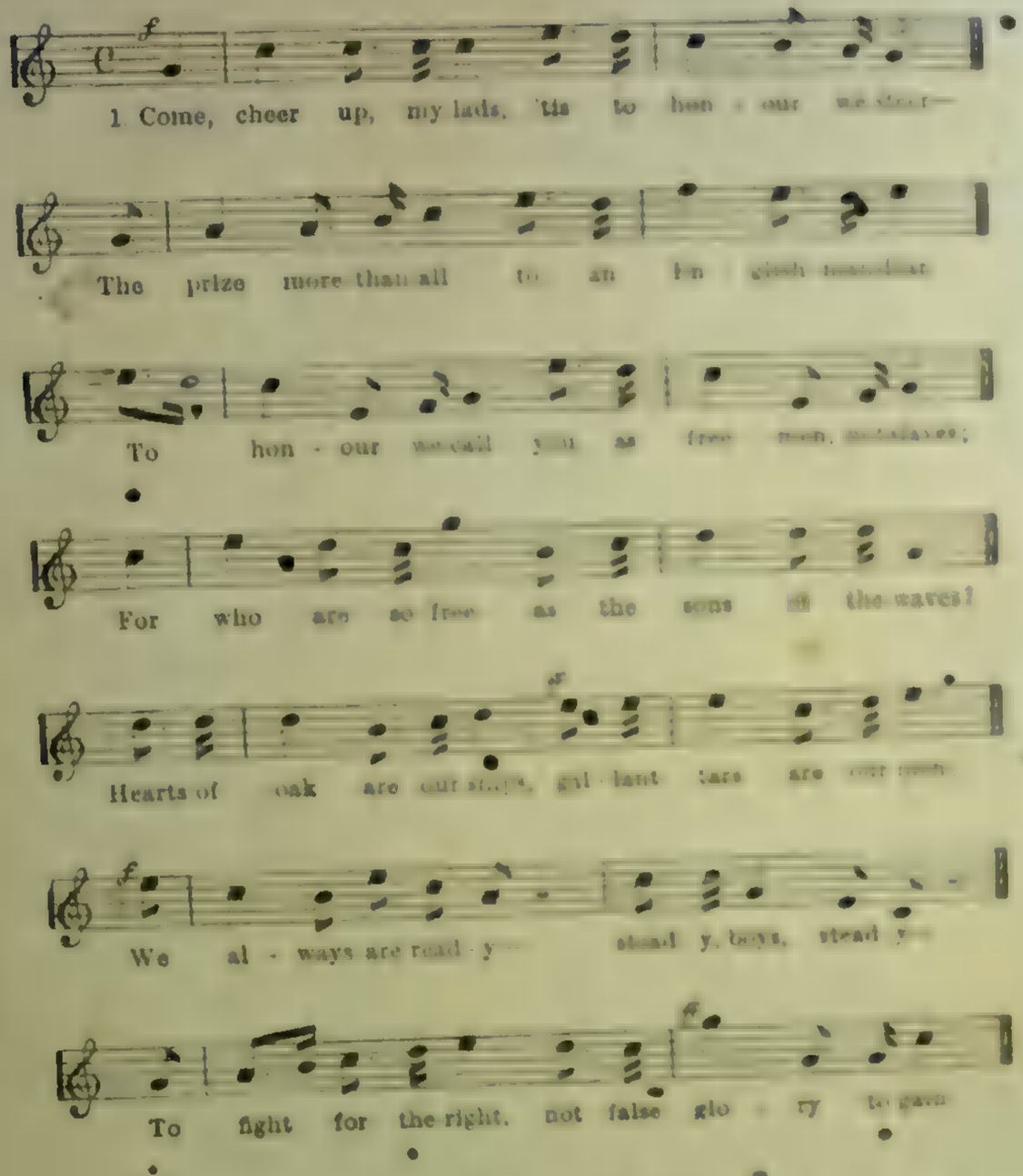
3.
Where'er o'er lands and seas,
Our flag upon the breeze
Its folds may fling;
Where'er the morning sun
Shines on our Empire won,
From loyal hearts shall come,—
"God save the King!"

(*Repeat first verse.*)

Key A.

d :d :r	t_1 :.d :r	m :m :f	m :.r :d
1. God save our	gra - cious King,	Long live our	no - ble King,
r :d :t_1	d :- :-	s :s :s	s :.f :m	f :f :f
God save our	King!	Send him	vic - to - ri - ous,	Hap - py and
f :.m :r	m :.f :.m	m :.f :s	l :.f :m	r :d :-
glo - ri - ous,	Long to reign	o - ver us,	— God save the	King!

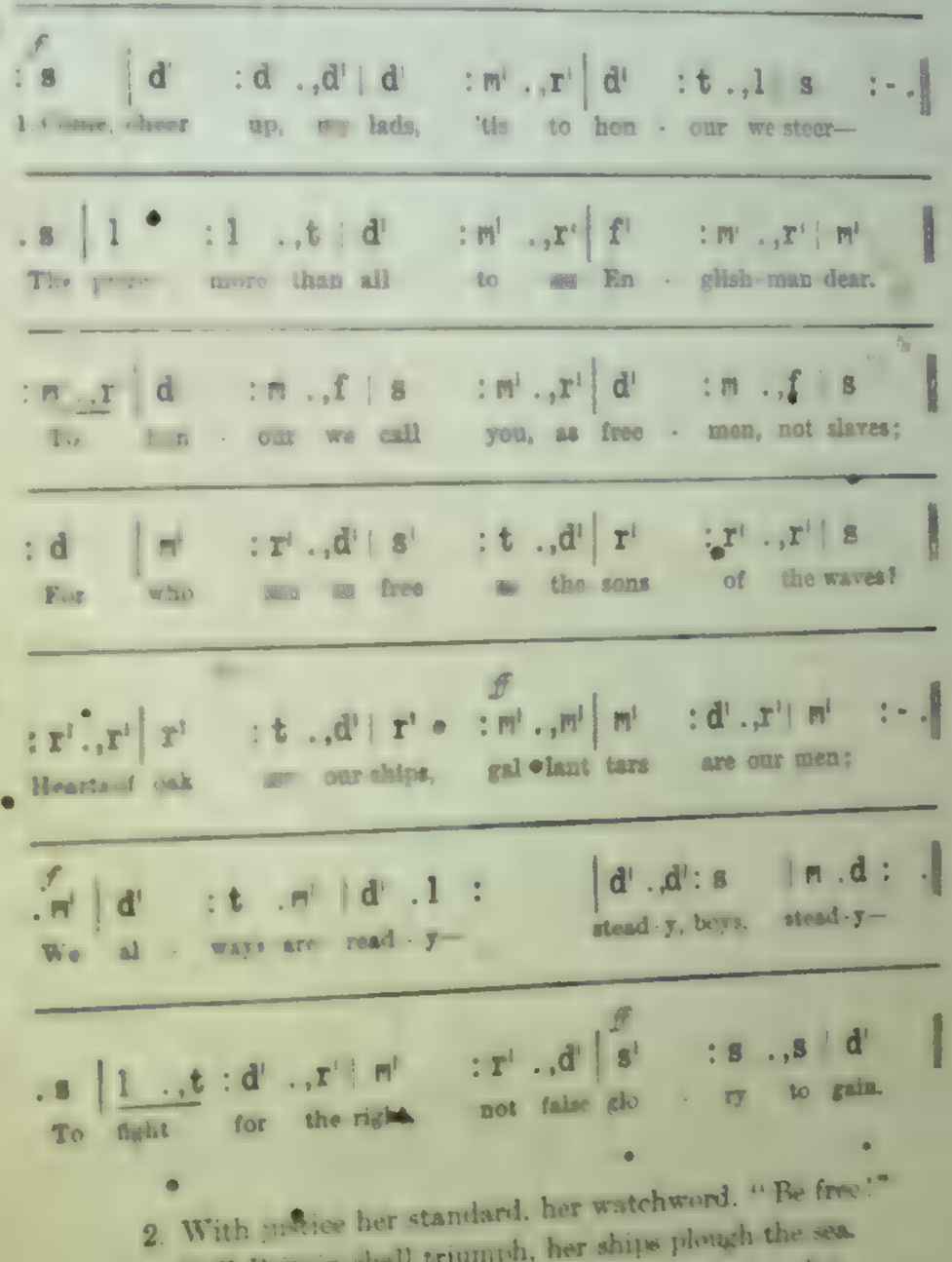
HEARTS OF OAK.



2. With justice her standard, her watchword, "Be free!"
Still Britain shall triumph, her ships plough the sea.
Then cheer up, my lads; with one heart let us sing,
"Our soldiers, our sailors, our statesmen, our Queen."
Hearts of oak, etc.

HEARTS OF OAK.

Key C



2. With justice her standard, her watchword, "Be free!"
Still Britain shall triumph, her ships plough the sea.
Then cheer up, my lads; with one heart let us sing,
"Our soldiers, our sailors, our statesmen, our Queen."
• Hearts of oak, etc.

THE BLUE-BELLS OF SCOTLAND.

1. *Oh where, tell me where can be found a flower as fair*
As the blue-bell 'mong the heath - er waving in the summer air?
Though gar-den flowers have beau - ty, they want the charm that dwells
In the wild Scot-tish blue-bells—the bon-nie sweet blue-bells.

2. *Oh say is it true that they ring in merry peals*
As the fairies in the moonlight go tripping o'er the hills?
In merry peals they ring on the hills and in the dells,
And fairies in the moonlight dance round the waving bells.

3. *The wild waving blue-bells on the heather mountain-side*
Have not the glow of roses in their golden summer pride,
The roses may be brighter, but my heart for ever dwells
With the wild Scottish blue-bells—the bonnie sweet blue-bells.

D.C.

KEY E FLAT.

:s.s | d' :d' | t :l | s :- | l :t.d' | r :m | f :r | d :- |
1. *Oh where, tell me where can be found a flower as fair,*					
As the blue-bell 'mong the heath - er waving in the summer air?					
:s | m :d | m :s | d' :- | l :t.d' | t :s | l :fe | s :- |
Though gar-den flowers have beau - ty, they want the charm that dwells					
| l :t | d' :d' | t :l | s :- | l :t.d | f :m | f :r | d :- |
In the wild Scot-tish blue-bells—the bon-nie sweet blue-bells.					

THE MINSTREL BOY.

Moderate time.

1. The min-strel boy to the wars is gone, In the ranks of death you'll find him;
His fa-ther's sword he has gird-ed on, And his wild harp slung be-hind him.
"Land of song!" said the war-rior bard, "Tho' all the world be-trays thee,
One sword at least thy rights shall guard, One faith-ful harp shall praise thee!"

2. The minstrel fell! but the foeman's chain
Could not bring that proud soul under;
The harp he lov-ed ne'er spoke again,
For he tore its chords asunder,
And said, "No chains shall sully thee,
Thou soul of love and bravery!
Thy songs were made for the pure and free;
They shall never sound in slavery."

KEY E FLAT. Moderate time.

:s | d :-.r | f.m :r.d | m :s | d' :t.,d' | l :-.s | m.,f :s.m | r :-.d d |
1 The min-strel boy to the wars is gone, In the ranks of death you'll find him;					
:s | d :-.r | f.m :r.d | m :s | d' :t.,d' | l :-.s | m.,f :s.m | r :-.d | d
His fa-ther's sword he has gird-ed on, And his wild harp slung be-hind him.					
:s | d :t | l :t.d' | t :l | s :.se | l :-.m | m :se | l :t.d' |
"Land of song!" said the war-rior bard, "Tho' all the world be-trays thee,					
:d' | d :-.r | f.m :r.d | m :s | d' :t.d' | l :-.s | m.,f :s.m | r :-.d d |
One sword at least thy rights shall guard, One faith-ful harp shall praise thee!"					

WORDS CONTAINED IN THIS BOOK.

I.—WORDS FROM BOOKS I. AND II.
(FOR REVISAL.)

1	4	7	10	13	16
A-bound′	an′-kle	begged	bound	can′-dy	clapped
a-broad′	an-oth′-er	be-gin′	bound′-ing	can′-non	clean′-ing
ab′-sence	an′-swer	be-gun′	bowed	cap′-tain	cleared
ab′-sent	an-swered	be-haved′	box′-es	cared	clear′-ing
ac-count′	anx′-ious	be-hind′	branch′-es	care′-ful	clev′-er
add′-ing	an-y-thing	be-hold′	brave′-ly	care′-less	climbed
add′-ed	an-y-where	be-ing	break′-fast	car′-ries	climb′-ing
ad-mired′	ap-pear′	be-lieved′	breath	car′-ry	closed
ad-vice′	ap-peared	be-long′	breathe	car′-ried	close′-ly
a-fraid′	ar′-my	bend-ing	breeze	catch′-er	clothed
Af′-ri-ca	a-round′	be-neath′	bridge	catch′-es	clothes
af-ter-wards	ar′-ti-cles	be-tween′	brief	catch′-ing	cloth′-ing

2	5	8	11	14	17
a-gainst′	A′-si-a	be-yond′	bright′-est	caught	clus′-tered
a-greed′	a-side′	Bi-ble	bright′-ly	cause	coarse
ails	a-sleep′	bid-ding	broad-ness	caused	coast
a-larm′	at-tack′	big-ger	bro-ken	ceased	cof′-fee
a-larmed′	at-tacked′	bright	brood′-ed	cell	cold′-er
a-las′	at-tend′	bit-ter	broth	cer-tain	col′-our
Al′-fred	at-tend′-ed	blast	broth′-er	cer-tain-ly	col′-oured
Al′-ice	au′-tumn	bleat	brought	chalk′-y	comb
a-loft′	a-void′	bleat′-ing	brushed	chance-l	com′-fort
al-read′-y	aw′-ful	blessed	bub-bl-ers	change-t	com-mon
al-though′		blink	bun-dle	chas′-ing	com-mon
a-mazed′	Back′-ward	blithe	bur′-den	chat-ter	com-mon

3	6	9	12	15	18
a-māz′-ing	bank	blocked	bur′-ied	chat′-tered	com-pa-ss
A-mer′-i-ca	bar′-gain	boast-er	burned	cheered	com-fort′
a-mongst′	bark′-ing	Bob′-by	burn′-ing	chee′-y	com-mit′
a-mount′	bas′-ket	bod′-y	bush′-y	cheese	com-ment′
a-muse′	bath′-ing	bod′-ies	bus′-i-ly	char-nies	com-trust′
a-mūs′-ing	bat′-tle	boiled	bus′-y	check′-ens	cook-ing
añ′-chor	beach	bold′-ly	but-ter	chief-ly	coops
ān′-cient	beast	bor′-der	but-ter-fly	chil′-dren	cop-per
An′-dy	beau′-ty	borne		choked	cor-al
añ′-ger	beau-ti-ful	bot′-tom	Call′-ing	choose	cor-ner
añ′-gry	beech	bough	calm	chos′-en	cot-tage
an′-i-mal	beg′-gar	bought	cam′-el	chorn-ing	

19	23	27	31	35	39
couch′-es	de-scry′	el-e-phants	fif′-ty	get′-ting	Hen′-ry
count′-ed	des′-ert	Em′-i-ly	find′-ing	gi′-ant	her-self′
count′-ing	de-sired′	em-ploy′	fin′-ger	giv′-ing	hid′-ing
coun′-tries	de-spair′	end′-eth	fin′-ished	giv′-en	high′-est
coun′-try	de-stroy′	en′-e-my	fir′-ing	glad′-ly	him-self′
coup′-le	di′-a-mond	en-gaged′	firm′-ly	glad′-ness	hold′-ing
cous′-in	dif′-fi-cult	En′-gland	fish′-es	glance	hol′-low
cov′-er	din′-ner	en-joy′	fish′-ing	glow′-ing	hon′-est
cov′-ered	dirt′-y	en-joyed′	flask	gold′-en	hon′-ey
cov′-er-ing	dis-cov′-er	e-nough′	flax′-ness	good′-ly	hon′-our
crea′-ture	dish′-es	en′-ter	flit′-ting	good′-ness	hope′-less
creeps	dis′-tance	er′-rands	flock′-ing	grand′-er	hop′-ing

20	24	28	32	36	40
creep′-ing	dis-tress′	e-scape′	flow′-er	grant′-ed	hop′-ping
crew	do′-ing	e′-ven-ing	fold′-ed	great′-est	hors′-es
cries	doubt	ev′-er-y	fol′-low	great′-ly	hos′-pi-ta-ble
cried	doz′-en	ex-am′-ple	fol′-lowed	gro′-cer	hot′-test
cry′-ing	dragged	ex-pect-ed	for lw-ing	group	housed
crowd	draw′-ing	ex-pect-ing	fool′-ish	grow′-ers	houses
crown	dread′-ful	e′-vil	for bids′	grow′-ing	hu-man
cru′-el	dream′-ing		force	grown	hun-dred
cru′-el-ty	dreamt	Fa′-ble	forced	Grum′-ble	hun′-ger
crumbling	drear′-y	fac′-to-ry	for′-est	guess	hun′-gry
cube	dressed	fag′-ot	for-get′	guessed	hunt′-ed
cured	dried	fail-ed	for-got′	guide	hunt′-ers

21	25	29	33	37	41
cuni	drift′-ing	faint′-ing	for′-mer	Hab′-it	hur-rah′
cur′-tain	drink′-ing	fair′-ly	fort′-night	hand-ful	hur′-ry
	driv′-er	fair′-y	for′-ward	hand′-some	hus-band
Dai′-sy	driv′-en	faith	four′-teen	hang′-ing	husk′-y
dance	driv′-ing	faith′-ful	fourth	hap-pens	
danced	drop-ping	fall′-en	France	hap-pened	I′-dle-ness
dan-cing	drop-ped	fall′-ing	Fri′-day	hap′-pi-ness	ill luck
dar-ling	drum-mer	false	friend	hap-py	im-fore′
dai-sies	dry-ing	fam′-i-ly	friend′-ly	hard′-er	inch-es
dark-ness		farm-er	frighten	hard′-ly	in-deed′
dar-ling		fast-er	from ast	harp-ness	In′-di-a
		fa-ther	frozen	har-vest	

22	26	30	34	38	42
dashed	dy′-ing	faults	fruit-less	hast′-ened	in-dulge′
daugh-ter	dy′-ly	fa-vour	fur-ther	hav′-ing	in-side
dawn	dy′-ing	fa-vour-ite		heard	in-stance
day-light	dyed	feared	Gain′-ing	hear-ing	in-stant
death	dy-ing	feath-ers	gar′-den	heart	Ire-land
de-ceit		feb-ru-ar-y	gath′-er	heart′-y	is-lands
deep′-ly	Ear′-ly	fed	gath′-ered	heav′-en	it-self
de-light	ea′-si-ly	fee′-ble	gain′-ing	heav′-y	
de-light-ed	ea′-sy	feet	gen′-tle	hedge	Jack′-et
dense	eat′-en	fell	gen′-tle-man	brought	joined
de-pend′	eat′-ing	fe-male	ger-ma-ny	hol′-ed	joints
de-scend′	ei′-ther	fierce-ly		help-ing	jour′-ney
		fifth			

43
judge
jumped
jump'-ing

Keep'-ing
kicked
killed
kill'-ing
kind'-er
kind'-ly
kind'-ness
king'-dom

44
kissed
kitch'-en
kit'-tens
knee
kneel
knelt
know
knit
knock
knock'-er
know
know'-ing

45
known

La'-bour
la'-boured
la'-dies
lan'-tern
larg'-er
larg'-est
latch
late'-ly
lat'-er
laugh

46
laughed
launch
la'-zi-est
la'-zy
leaf-y
leaped
learned
learn'-ing
leath'-er
leaves
leav'-ing
ledge

47
lem'-on
length
les'-son
let'-ters
lib'-er-ty
lift'-ed
lift'-eth
lift'-ing
light'-er
light'-ly
liked
limb

48
lin'-en
lis'-ten
lis'-tened
lit'-tle
live'-ly
liv'-ing
load'-ed
locked
London
long'-ly
lon'-ger
looked

49
look'-ing
loud
loud'-er
loud'-ly
love'-ly
lov'-ing
low'-er
low'-ered
low'-al
Lu'-cy
ly'-ing

50
Mad'-am
maid'-en
mak'-er
mak'-ing
man'-ner
march'-es
march'-ing
marked
mar'-ket
mar'-ried
mas'-ter
mat'-ter

51
mean'-ing
meant
mean'-time
mem'-ber
mer'-cy
mer'-ry
mer'-ri-ly
mice
mid'-dle
might
mind'-ful
min'-ers

52
min'-utes
missed
mis'-sing
mis'-tress
mis'-take
Mon'-day
mon'-ey
Moore
morn'-ing
mos'-sy
moth'-er
mount

53
mov'-ing
mount'-ed
moved
mud'-dy
muffs
mu'-sic
my-self'

Nar'-row
na'-tive
naught'-y
near'-er

54
near'-ly
nei'-ther
night'-ly
ninth
no'-ble
nois'-y
north
nos'-es
noth'-ing
no'-tice
num'-ber
nurse

55
O'-cean
of'-fer
of'-fers
of'-fered
of'-fic-ers
old'-est
o'-pen-ing
o'-pened
or'-der
orph'-an
oth'-er
out'-side

56
o'-ver-come
owned
own'-er

Paint
paint'-er
pain'-ty
pa'-per
pa'-per-s
par'-ing
par'-lour
par'-ty

57
pas'-sage
pas'-ses
passed
pas'-sing
peace
pearl
peck'-ing
pet'-al
pen'-ny
peo'-ple
perch
per-haps'

58
per'-ish
per'-ished
per'-son
per-suad'-ed
picked
pic'-ture
piece
pie'-ces
pierced
piled
pinched
pit'-y

59
plan'-es
plan'-ing
play'-ing
pleas'-e
pleased
pleas'-ure
pledge
plen'-ty
plough
ploughed
pock'-et
pour'-ed

60
po'-ny
port'-er
pos-sess'
poul'-try
pound
pow'-er
praised
prayed
pre-pare'
pre-pared
pres'-ent
pres'-ent-ly

61
pressed
pret'-ti-est
pret'-ty
prey
prince
prin'-cess
pris'-on
pris'-on-er
prize
pro-cess'-ed
prom'-ise
pron'-ised

62
pro-tect'
proved
prov'-ing
pud'-ding
pulled
pull'-ing
pur'-pose
purr'-ing
purs'-es
pushed
push'-ing

63
put'-ty
put'-ting

Quar'-ters
queen
queer'-est
ques'-tion
quick'-est
quick'-ly
quiet
quiet'-ly
quite

64
Rain'-y
raised
raised
reach
reached
reach'-ing
read'-er
read'-ing
read'-y
reaped
reaped
rea'-son-ed
re-cov'-er
re-main'
re-mem'-ber
re-peat'
re-peat'
re-solved'
re-turn'

65
rich'-es
ri'-ches
ri'-ding
right'-ly
ring'-ing
riv'-er
rob'-ber
Rob'-ert
roll'-ing
root'-ed
ros'-es

67
run'-ning
rushed
rush'-ing

Sad'-ly
safe'-ly

70
sor'-rest
sorved
sor'-row
sor'-row-ful
sor'-ry
sor'-ry-ing
sheil'-ter
shoes
short'-er
should
shout'-ing

71
shout'-ed
shov'-els
show'-ers
showed
shown
shuf'-fles
si'-lence
silk'-en
sil'-ly
sil'-ver
sim'-ple
sim'-ply

72
sing'-ing
sin'-gle
sis'-ter
sit'-ting
six'-pence
sky'-lark
sleep'-less
slip
slipped
slip'-ping
slow'-ly
slung

74
snug'-ly
sol'-dier
some-times
soon'-er
sor'-row
sor'-ry
sound'-ed
sound'-ing
sowed
speak'-ing

76
square
squir'-rel
stable
stair'-case
stand'-ing
start'-ed
stay
stay'-ing
stay'-ed
stick'-ing
stiff
stiff'-ly
stock'-ing
stone
stood

77
stool
stream
strength
stretch
stretched
stroll
stroll'-ger
stroll'-gest
strug'-gled
stu'-pid

78
stud'-y
suc-ceed'
sud'-den
suf'-fer
sug'-ar
sum'-mer
Sun'-day
sun'-ny
sun'-shine
sup'-per
sup-plied'
sup-pose'

79
sur'-ly
swear
sweet'-est
sweet'-ly
sweet
switch

Ta'-ble
tak'-ing
talk'-er
talked
talk'-ing
tame
tame'-ly
tame'-ness
tap'-ping
tar'-ry
tar'-ry-ing
tast'-ed
tast'-ing
tast'-y
them-selves'
thence

81
thick'-er
thief
think'-ing
thirst'-y
thir'-ty
though
thought
thou'-sands
thread
throat
through
throw'-ing

82
thrown
thun'-der
thurs'-day
ti'-dy
ti'-ger
Ti'-ny
tired
to-geth'-er
toil'-ing
tongue
toss'-ing
touched

83
to-wards'
tracked
trained
treas'-ures
treat'-ed
trem'-ble
trem'-bling-ly
troops
trou'-ble
tru'-ly
trunk
trust'-ed

84
truth'-ful
try'-ing
Tues'-day
turned
turn'-ing
tur'-nip
twelve
twen'-ty
twice

Un'-cle
un-hap'-py

85
un-hurt'
un-less'
up'-right
up-stairs'
use'-ful
us'-ing
us'-u-al
ut'-ter

Val'-ley
verse
vic'-tims

86
vil'-lage
vi'-o-let
voice
voic'-es
voy'-age

Wait'-ed
wait'-ing
walked
walk'-ing
wan'-der
want'-ed

87
warm'-ing
warn'-ing
wash'-ed
watch'-es
watch'-ful
watch'-ing
wa'-ter
wear'-ing
wear'-y
weave
Wed'-nes-day
wel'-come

88
weight
what-ev'-er
when-ev'-er
wher-ev'-er
whether
whis'-per
whist'-ed
Whit'-ing
win'-dow
wiped
wit'-ness

89
wives
wom'-an
wom'-en
won'-der
won'-dered
won'-der-ful
won'-der-ing
wool'-len
work'-ing
worse
would
wound'-ed

90
wrest
wrest'-ing
wres'-tle
wring
write

Yel'-low
yes'-ter
yes'-ter-day
your self'
your-selves

II.—NEW WORDS IN BOOK III.

1

A-bil'-i-ties
a-bound'-ed
ac'-cents
ac'-çi-dent
ac-cord'-ing
ac-cord'-ing-ly
ac'-tive
ad'-der
ad'-mi-ra-bly
ad-mir-a'-tion
a-do'

2

a-dopt'
a-dopt'-ed
a-dorned'
af-fairs'
af-fec'-tion
Af'-ri-can
af-ter-noon'
ag'-o-ny
a-gree'-a-ble
aid'-ing
air'-y

3

Al'-bert
al-lowed'
al-low'-ing
al-might'-y
Al'-pine
Alps
a-maze'-ment
am-bi'-tious
a-mid'
am'-ply
an-çes'-tral

4

an'-chor-ing
an'-cient
an'-gels
an'-gri-ly
an'-kle
an'-vil
ap-pa'-rent-ly
ap-pear'-ance
ap-plied'
ap-pren'-tic-es
apt

5

A-ra'-bi-a
Ar'-abs
a-rith'-me-tic
a-roused'
ar-riv'-al
ar'-tist
as-cent'
a-shamed'
a-shore'
as-sem'-bled
as-sist'

6

as-sist'-ing
a-ston'-ished
a-ston'-ish-ing
at-tach'-ment
at-tained'
at-tempt'-ed
at-tempts'
at-ten'-tion
at-ten'-tive-ly
at-tract'-ed
a-wakes'

7

a'-yah

Baf'-fled
bal'-anc-ing
bal'-lad
bam-boo'
bared
bawled
beck'-on
be-gin'-ning
be-hav'-iour

8

be-like'
be-longed'
be-long'-ing
bel'-lows
ben'-e-fits
Ben-gal'
be-num'-bed'
Ber'-nard
be-ware'
bit'-ter-ly
Blair

9

blank
Blen'-heim
bless'-ing
blith'-er
blood
blos'-som
Bo-he'-mi-a
boot'-y
borne
bor'-row
bo'-som

10

bow'-ers
braced
Brag'-gart
brain
bram'-ble
bran'-dy
bra'-vo
brawn'-y
break'-fast
break'-ing
breast

11

breath'-ing
bud'-ges
bri'-ers
bril'-liant
brin'-y
Brit'-ish
Bruce
bruised
bumped
Bush'-men
bus'-iness

12

but'-ler
buz'-zing
by'-stand-ers

Can'-dle
cap'-tive
car-a-van'
ca-ressed'
ca-ress'-es
car'-go
car'-pen-ters

13

[illegible]
cas'-ing
cas'-tle
cat'-kins
cau'-tions
caw'-ing
Ce'-cil
cel'-lar
[illegible]
Cey-lon'
chap'-ter

14

[illegible]

15

[illegible]

16

[illegible]
clus'-ter-ing
cob'-web
coil
coins
col'-lar
col'-liers
com-mand'-ments
com-menced'
com-mit'-ted
com'-mon-ly

17

com'-pe-tent
com-plaint'
com-plet'-ed
com'-rades
con-cealed'
con-fessed'
con-fined'
con'-quered
con'-quer-or
con-sid'-er
con-sists'

18

con'-stant
con'-stant-ly
con-tin'-ue
con-tin'-ued
con'-tra-ry
con-trive'
[illegible]
con'-vent
con-vey'
cool'-est
cool'-ness

19

cot'-tag-er
coun'-sel
coun'-sel-lor
cour'-age
[illegible]
cov'-ert
cow'-ard-ly
[illegible]
Cre'-sy
crest'-ed
crime

20

crisp
cross'-ing
cru'-el-ly
cu'-ri-ous
cu'-ri-ous-ly
cus'-tom

Dam'-sel
dan'-de-li-ons
dan'-ger-ous
dark'-en

21

de-ceit'
de-ceiv'-ing
De-cem'-ber
de-cid'-ed
de-clare'
de-clared'
deep'-er
de-fend'-ing
de-fied'
del'-i-cate
de-liv'-er
de-liv'-er-ance

22

de-liv'-er-ers
de-pend'-ed
de-scent'
de-scribes'
de-sign'
de-stroyed'
de-stroy'-ing
[illegible]
de-vot'-ed
dew
dif'-fer-ence
dif'-fer-ent

23

dif'-fi-cul-ty
dil'-i-gent-ly
di-rec'-tion
dis-ap-point'-ed
[illegible]
[illegible]
[illegible]
dis-perse'
dis-played'
dis'-tant
dis-turb'
dis-turbed'

24

ditch
dived
di-vine'
diz'-zy
do'-cile
doc'-tor
dodged
dome
doub'-led
doubt'-ing
down'-ward
doze

25

draughts
droll
duke
dull'-est
dun

Ea'-ger
ea'-ger-ly
ear'-li-est
ear'-nest
ea'-si-er
East'-ern

26

eaves
Ed'-ward
ef-fect'
ef'-forts
elms
else'-where
e-mo'-tion
em-ployed'
emp'-ty
en-a'-ble
en-cour'-aged
en-deav'-our

27

en-gin-eer'
en'-gines
En'-glish
[illegible]
[illegible]
e'-qual
Es'-ki-mos
e-spec'-ial-ly
e-spied'
Eu-gene'
e-vent'
ev'-er-y-thing

28

ev'-i-dence
ex-act'-ly
ex-am'-ine
ex-ceed'
ex-cit'-ed
ex-claimed'
ex'-er-cis-es
[illegible]
ex-haust'-ed
Ex'-o-dus
ex-pect'-ant
ex'-treme-ly

29

Fair'-ies
faith'-ful-ly
famed
fa'-mous
fan'-cy
fan'-cied
fanes
farm'-ing
fash'-ions
fash'-ioned
fast'-ened
fa-tigue'

30

fawn
fear'-ful
feast
feath'-ered
fer'-vent-ly
fiend
fif'-teen
fig'-ure
fi'-nal
fin'-est
firm'-ly
fish'-er-man

31

fit'-ted
Fitz-war'-ren
flank
flap'-ping
flat'-ter-ing
flee'-cy
flex'-i-ble
fling'-ing
[illegible]
[illegible]
[illegible]
foot'-marks

32

foot'-steps
[illegible]
forge
for-giv'-en
for-got'-ten
[illegible]
[illegible]
[illegible]
freck'-led
free'-dom
French
fret'-ting

33

fringed
frol'-ic-some
fruit'-ful
ful-fil'-ling
fu'-ri-ous-ly
fur'-long
fu'-ture

Gal'-lant
gal'-ler-ies
gar'-ret
gauz'-y

34

gay'-est
gazed
gaz'-ing
glad'-some
glar'-ing
glee
glis'-tened
gloom'-y
gnats
gor'-ing
gos'-sips
grand'-child

35

grand'-pa-pa'
grate'-ful
grat'-i-tude
greed'-y
[illegible]
[illegible]
[illegible]
grinned
groves
growl
guard
guests

36

guid'-ed
Guilt

Hag'-gard
hail'-ing
hal-lo'
hal-looed'
[illegible]
[illegible]
[illegible]
[illegible]
[illegible]

37

hard'-ship
har'-rowed
harsh
hast'-i-ly
haw'-thorn
hearth
heart'-y
[illegible]
[illegible]
[illegible]
[illegible]
help'-less

38

[illegible]
Hin-doo'
[illegible]

39

[illegible]

40

I-de'-a
[illegible]

41
in′ju-ry
in′mate
In′no-cence
in′no-cent
in′sect
in-stead′
in′stru-ment
in-sure′
in-tel′li-gent
in-tend′ed
in′ter-est-ed
in′ter-est-ing

42
in-ter-rupt′
[illegible]
in-vite′
in-vit′ed
in-volves′
i′ron-ing
I-tal′ian
It′a-ly
i′vo-ry

Ja-pan′
jol′ly

43
juice
jun′gle
jus′tice

Kas′par
knight′ed
knots
knowl′edge

La′den
lan′guage
lash′es

44
Lat′in
laugh′ter
law′yer
la′zi-ly
lead′ing
leak
Le′o-pold
Les′ter
lev′elled
lib′er-al
lin′ger-ing
liq′uors

45
Liv′er-pool
Liz′zy
Lo′gan
lone′some
loose
loos′ened
low′ered
loy′al-ly
luck′i-ly
lurch

Ma-chine′

46
main-tain′
[illegible]
man′age
man′aged
[illegible]
[illegible]
man′tle
mar′riage
ma-te′ri-als
may′or
mead
mean′ing

47
meas′ured
med′i-cine
meet′ing
mel′o-dy
mel′o-dies
mem′ber-ship
mem′o-ry
mer′chant
mer′cy
mer′ri-est
meth′od
mid′night

48
midst
mill′ers
mim′ics
min′gled
min′ster
mis′chief
mis′er-y
miss′ing
mis′sion-a-ry
mis′tle-toe
mis-took′
mod′er-ate

49
mod′est
Mof′fat
moist′en
mon′arch
mon′keys
monks
mon′ster
mor′tal-ly
Mo-tee
mot′to
mourn
mov′ing

50
[illegible]

Nap′kin
[illegible]
nat′u-ral
nat′u-ral-ly
neat′ness

51
[illegible]
neg-lect′ing
[illegible]
neph′ew
nerves
New′found-land
nim′ble
no′ble-man
no′bod-y

52
nook
nor′thern
Nor′way
nos′trils
no′ticed
nought

Oath
o-bliged′
ob′sta-cles
ob′sti-nate
oc-ca′sion

53
[illegible]

54
[illegible]

Pack′et
[illegible]

55
[illegible]
par-tic′u-lar
[illegible]
path′less

56
[illegible]
pen′al-ty
per′fect
per′fect-ly
per-formed′
[illegible]
port

57
Pe′ter-kin
pi-a′no
pick′ax-es
pic′nic
pit′men
plaid
planned
play′mate
plead
pleas′ant
[illegible]

58
[illegible]

59
[illegible]

60
[illegible]
pro-phe-cy

61
[illegible]

62
Qual′i-ties
[illegible]

Raft
[illegible]

63
[illegible]

64
[illegible]
re-mind′
re-mind′ed

65
re-moved′
re-paired′
re-peat′
re-port′
re-pose′
rep-re-sent′
re-quest′
re-quires′
res′cue
res′cu-ers
res′i-dence
re-solved′

66
re-spect′ful
re-sult′
re-traced′
re-venge′
re-vive′
re-vived′
re-ward′ed
Rich′ard
rid′ing
[illegible]
risk
ri′val

67
riv′u-let
[illegible]
robe
roe
rogue
romp′ing
rooks
rot′ting
rouse
[illegible]

68
[illegible]

Sab′bath
[illegible]

69
scam′per
scam′pered
[illegible]

70
[illegible]

71
[illegible]

72
[illegible]
six′teenth

73
sketch
skull
slacked
[illegible]

74
soar′ing
[illegible]

75
[illegible]

76
[illegible]
striped

77
[illegible]

78
[illegible]

79
[illegible]

Tank′ards

80
[illegible]

81

Thames
thatched
there-fore
thick-et
thiev-ing
thim-ble
thrash-ing
thread-ed
thrift
thriv-ing

82

throng
tim-id
tim-id ly
tinged
tire-some
toiled
to-mor-row
tor ment-or
tor-toise

83

tram-pled
tram-pling
trap-per
trav-elled
trav-el-ler
trav-el-ling
tread
treat-ment
tri-al

84

tri-umph
trot-ting
trouble
trou-bled
trudged
Tru-man
tugged
tum-bles
tur-bot
twen-ti-eth

85

twist
twist-ing
twit ter-ing
ty-ing
ty-rant

Un-bound-ed

un-cared
un-com-fort a ble

86

un-com-mon
un-der stand
un-ea-sy
un-grate-ful
un harmed'
u-ni corn
un-ion
u-nite
u-nit-ed

87

un-kind-ly
un-like'
un-luck-y
un-ru-ly
un-tie'
un-tied'
un-u-su al
un-will-ing
up-lift-ed
up-spring-ing

88

urged
ur-ges
u-su al ly
ut-most
ut-tered
ut-ter ly

Va-can-cy

val-u a-ble

89

val-ue
va-ri ous
ven-ture
ven-tured
ver-i fied
ves-sel
vest
vex-a-tion
vexed

90

vi-cious
vic-tims
vic-to-ry
vi-o lent
vis-it
vis-it ed
vis-it ing
vis-i-tor

Wag-ging

91

wag-gon
wag-gon er
waist
wan-ton
watch-ing
wa-ter-fall
Wav-ing
wea-ry
weath-er

92

wear-ing
weath-er
wedded
wher-ev-er
whip-per-snap-per
whole
whol-ly
whis-per-ing
whisk-ing

93

whis-pered
whis-tled
whis-tling
whith-er
Whit-sun-day
why-ev-er
Wil-liam
wolf-hows
wo-ry
wo-ven

94

wrap-ping
wrin-kles
wrong-ed
wrong-ful
wrin-kled
wrists
writ-ten
wrong-ing

95

writ ten
wrought

Yean

yes-ter-day
yon-der

Zig-zag'

III.—CONTRACTIONS.

can't, cannot.
couldn't, could not.
didn't, did not
doesn't, does not.
don't, do not.
e'er, ever.
hadn't, had not.
he'd, he would
here's, here is.
he's, he is
I'd, I would.
I'll, I will
I'm, I am.
is't, is it.
I've, I have.
know'st, knowest.
let's, let us.
'mid, amid.
'midst, amidst.
Mr., Mister.
Mrs., Mistress
need'st, needest
ne'er, never.
o'er, over.
she's, she is
shouldn't, should not.
that's, that is
there's, there is.
'tis, it is
'twas, it was.
'twere, it were.
we'd, we would
we'll, we will.
whate'er, whatever
whene'er, whenever
won't, will not.
you'll, you will.
you're, you are
you've, you have.

SCIENCE PRIMERS *Edited by*

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CHEMISTRY.

PROF. ROSCOE

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PREFACE.

In publishing the Science Primers on Chemistry and Physics, the object of the Authors has been to state the fundamental principles of their respective sciences in a manner suited to pupils of an early age. They feel that the thing to be aimed at is, not so much to give information, as to endeavour to discipline the mind in a way which has not hitherto been customary, by bringing it into immediate contact with Nature herself. For this purpose a series of simple experiments has been devised, leading up to the chief truths of each science. These experiments must be performed by the teacher in regular order before the class. The power of observation in the pupils will thus be awakened and strengthened; and the memory and accuracy of the knowledge gained must be tested and increased by a thorough system of questioning.

The study of the Introductory Primer will, in most cases, naturally precede that of the above named subjects; and then it will probably be found best to take Chemistry as the second and Physics as the third stage.

Boxes containing the whole of the chemical apparatus and specimens needed for the experiments are supplied by the Publishers; by Messrs. Philip Harris and Co., Ltd., Birmingham; Messrs. John J. Griffin and Sons, 22 Garrick Street, London; or by Messrs. Jas. Woolley, Sons, and Co., Market Street, Manchester; for £5 10s.

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SCIENCE PRIMERS.

CHEMISTRY.

FIRE—AIR—WATER—EARTH.

1. **Here are four things which we all know well; let us try to learn what Science teaches us about them.**

The study of these matters constitutes a part of the study of nature; it is in nature, or in the visible world around us, that these things occur, it is there that we learn what they are, it is there that we can handle and examine them. This handling and examination of the objects of nature is called **Experiment**; and it is either by observation or by experiment that we learn all we know about what goes on around us. To find out and explain what goes on when the **Fire** burns, to tell how the **Air** makes the fire burn or helps the plant to grow, to find out what **Water** is made of, and to learn the many different substances which can be

dug out of the **Earth**; all this belongs to the **Science of Chemistry.** Let us try to get hold of a few ideas about these interesting subjects; and first let us remember that in the Introductory Primer we have been taught the meaning of the words solid, liquid, and gas. The **earth** on which we stand is a solid, the **water** which runs about on the earth's surface is a liquid, and the **air** which surrounds the earth is a gas. You have learnt some of the common properties of earth, water, and air; you have now to learn something new about these things, what they are made up of and how their several parts can be obtained. Before we begin to study the chemistry of air, water, and earth, let us start with **Fire,** about which you have not learnt much.

FIRE. § I.

2. What happens when a candle or a taper burns?

The wax as well as the wick of the taper gradually disappears as the taper burns, and at last all is gone—wick, wax, and all. What has become of the wax? It has disappeared. Is it lost? So far as our eyes are concerned certainly it is lost, but so is the ship which sails away on the sea, and yet we know that the ship still exists though we do not see it; and so the lump of sugar appears to be lost when we put it into a cup of hot tea, and yet we know that

the sugar is not really lost, because the tea is made sweet. Now we must look for the wax of our taper in another way; we must put a question to Nature for her to answer, and we shall always find that our question, if properly asked, is always clearly and certainly answered. We must make an **Experiment,** and if this is properly made we shall never fail in the end to get the information we want.

EXPERIMENT 1.—Let us burn our taper in a clean glass bottle with a narrow neck; after it has burnt for a few minutes we notice that the flame grows less and less, and in a short time the taper goes out. This is the first thing we have to observe. We must have to discover **why** the taper goes out. For this purpose let us see whether the air in the bottle is now the same as it was before the candle was burnt. How can we tell this? Let us pour some clear **lime-water**[1] first into a bottle filled with air in which no candle has burnt, and then into the one in which our taper burnt. You see the difference at once! In the first bottle the lime-water remains clear, in the second it becomes at once milky. Hence we see that the air has been changed in some way by the burning of the taper. This milkiness

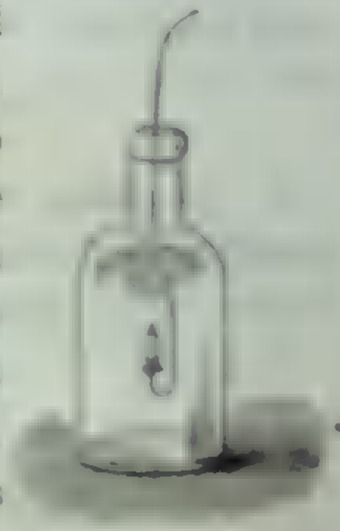

Fig. 1

[1] Made by letting a piece of fresh lime stand in water and shaking it up, and then letting the water get clear again.

is nothing else than **chalk**, and chalk is made up of **lime** and **carbonic acid**. Carbonic acid is, like common air, a colourless invisible gas which we cannot see, but which we find turns the lime-water milky, and puts out a burning taper. Part of the wax has been changed by burning into this carbonic acid gas; that is, the **carbon** or **charcoal** of the burnt wax is to be found again in this invisible gas. Some of this carbon you may notice going away unburnt as smoke or soot; and if you quickly press a sheet of white paper on to the flame so as not to burn the paper, you will see that it becomes stained with a black ring of soot or carbon.

3. **Besides carbonic acid gas there is another substance formed when the candle burns, viz. Water.**

You may perhaps think it strange that water is formed in the hot flame. Still a simple experiment will show you that this is really the case. If water comes off from the flame, it will be in the state of hot steam, which you cannot see, for what we commonly call steam coming out of the boiling kettle is not steam, but fine drops of water; and if you had a glass kettle, and could look inside it, you would see nothing above the boiling water, because steam is an invisible gas like carbonic acid and common air. Now as the steam from the kettle becomes small drops of water when it cools, so the hot air coming from the burning taper, if it contains

steam, must deposit the steam in the form of drops of water when it is cooled.

Experiment 2.—All we need to do to see whether steam is given off from a burning candle, is to hold a cold, dry, bright glass, such as a tumbler, over the flame of our taper. You see that the bright glass is at once dimmed, and if you look carefully you will notice the little drops of water which bedew the inside of the glass. If we went on for some time, and if we so arranged the experiment as to keep the glass always cool, we could get a wine-glass full of water by burning a candle, and the water thus got is like all other pure and good water, except that it may perhaps taste a little of soot.

Fig 2.

Let us now look back as to what we have learnt about our candle burning; for it is most important always to get clear ideas, first, as to what we want to prove by our experiments, and secondly, as to what we have to learn from them.

We want to know what happens when a candle burns. We have learnt—

1. That the candle soon goes out if it be burnt in a bottle of air.

2. That a colourless invisible gas called **carbonic acid** is formed in the bottle after the candle has burnt.

3. That the carbonic acid gas comes from the carbon or soot contained in the wax.

4. That water is also formed when the candle burns.

We therefore have learnt that the wax of the candle has **not been destroyed** or lost, but that it **has changed its form** and has been converted into carbonic acid and water. This sort of an entire change is called a **chemical change**. No one could have foretold that the wax would have changed into two totally different substances; it is only by making these careful trials that we learn what happens in such cases as these: hence Chemistry is called an **Experimental Science**.

FIRE. § II.

4. When a candle burns nothing is lost.

Our experiment with the taper gives us at once an answer to the question, Where does all the coal go to in a common fire? It goes up the chimney as carbonic acid gas. We heap on coals all day long, and take away next morning only a shovelful of ashes—the coal has burnt away. But this is not a sufficient answer. We have got next to find out what happens to the carbon of the wax or of the coal when it burns away and flies up the chimney as carbonic acid gas.

EXPERIMENT 3.—For this purpose we must make another experiment. Here we have a glass tube

(a common lamp-glass made with a narrow part in the middle will do very well) with a cork at the bottom, through which some holes are bored; into one of these holes I stick a piece of our taper. In the upper part of the tube I have placed some pieces of a white substance called caustic soda, of such a size that they do not fall through the narrowed part of the glass. Now I hang the tube, with the taper

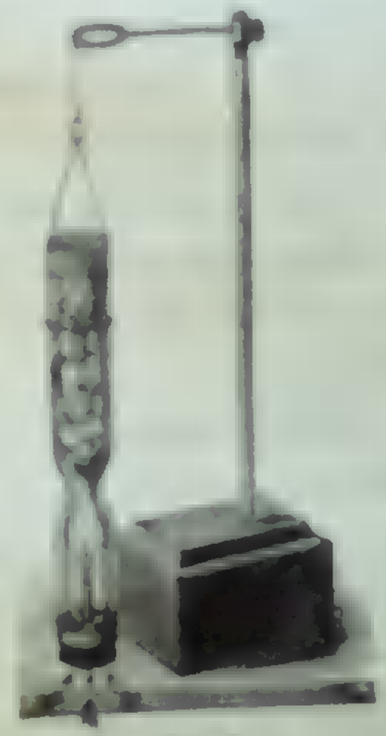

Fig. 3.

and caustic soda, on to one end of a pair of common apothecaries' scales, and put weights at the end until the tube is quite balanced. Having balanced the tube, I may remove it from the end of the beam of the scale, and hang it up onto the ring of the iron stand as shown in the figure. The air passes through the

holes in the cork into the tube, and so the candle can burn. I next light the taper and quickly replace it and the cork, and allow it to burn in the draught of air. After the taper has burnt for a few minutes, I blow the candle out, and again hang the tube onto the end of the scales. Now, if you look at the scales you will find that they are no longer balanced, but, strange as it may seem, the tube in which the taper has been burnt is really heavier than it was before the candle was lighted, although some of the candle has disappeared. This is then what our experiment teaches us. We must try to understand how the candle, after it is burnt, weighs more than before it was burnt. In the first place, then, I put the lumps of caustic soda in the tube above the taper, in order that the two invisible gases—carbonic acid and steam—which we now know are always given off when the taper burns, shall not escape from the tube, but shall be held fast by this caustic soda (just as fish may be caught in a net). Having then caught these gases, we discover that they are heavier than that part of the original candle which has been burnt. How can this be explained? Why, only by supposing that something having weight has been joined to or has united with the substance of the taper to produce the two gases in question. This supposition turns out to be correct, and this something is another colourless gas which partly makes up common air, and is called **oxygen gas**. Now we can more clearly understand what goes on when the

taper burns. Whilst the act of burning is going on, the substance of the wax (or coal) is uniting chemically with the oxygen of the air. The carbonic acid and steam formed are the results of that chemical union. These gases weigh more than the wax (or coal) which is burnt, because they contain something else besides, viz. oxygen, taken up from the air. If we had weighed the air, we should have found that the air had lost exactly as much weight as the burnt wax (or coal) had gained, viz. the weight of the oxygen.

5. What we have learnt.

Now we have learnt two most important things about the burning of a candle, (1) that nothing really disappears or is really lost; (2) that the parts of the candle are uniting chemically with the oxygen of the air.

By making these three simple experiments, and by trying to find out what they teach us, we have learnt more about Fire than all the ancients knew, so that you now understand the use of experiments; and when you come to read the Physics Primer, Articles 4 and 5b, you will learn still more about the *Nature of Heat*.

Let us, however, go on a step further, and let me tell you that in all the experiments which are given in this book, or which you will ever make for yourselves, you will always find the same truth come out—that no substance is ever really lost. We

cannot really destroy, neither can we really create any substance. Another fact which you have learnt from the burning candle is also true in other cases, viz. that wherever chemical union is going on there **Heat** is sure to be felt, and when that union goes on quickly we see **Flame** or **Fire**.

6. **Heat felt when chemical union goes on.** Let us make two experiments about this.

EXPERIMENT 4.—Take a lump of **quicklime**, put it on a tin plate, and pour over it some cold water;

FIG. 4.

you will soon see that the water and the lime both begin to get hot, and the water hisses on the hot lime till at last it boils, and clouds of steam are given off. The lime remains on the plate as a fine dry white powder, called **slaked-lime**. We have only done what the bricklayers do every day to make their mortar; we have slaked the lime. Why should all

this heat and steam arise? It arises because the water and the quicklime have combined together chemically, and the result is slaked-lime.

EXPERIMENT 5.—Put some yellow powdery **flour of sulphur** on the bottom of a small glass flask, and above this put into the flask some bright copper **turnings**. Next place the flask on an iron stand, and heat it over the flame of a gas lamp for the purpose of boiling the sulphur. We will place the lamp

FIG. 5.

on a common plate, to catch the sulphur if the flask should chance to crack. Now look what happens. First the yellow sulphur melts; it gets darker and darker in colour, and at last it boils. Now the boiling sulphur touches the copper turnings, and we may remove the lamp, when we see that the turnings first become red hot and glow with a splendid lurid red light, and then melt and drop down to the bottom of the flask. When the flask is cold we break it open,

and find that it contains neither bright copper nor yellow sulphur, but that a black substance is found at the bottom. What is this? It is a chemical compound of the two different things, copper and sulphur; the copper has united chemically with the sulphur, and whilst they were joining, heat was given off, or the copper took fire and burnt.

7. What we have learnt.

Now I think you have learnt that where there is Fire there chemical union is going on, whether it is a taper burning, or a hayrick on fire, or a house on fire. In all these we have the same thing going on, viz. chemical union of the parts of the burning body with the oxygen of the air. And so from Fire we get to Air.

AIR. § III.

8. About the Air.

How do you know that there is anything between you and me in this room? What makes you say that there is Air out of doors? If you move your hand and arm quickly round and round, you will feel a draught of air through your fingers; if you fan yourself, you feel the air passing over your face. Out of doors you notice the Wind blow, you see the trees or the clouds moved by the breeze, and this breeze is only the air in motion.

What makes the sails of a windmill go round and round? The wind, you say. Well then, this wind which blows sometimes so hard as to uproot trees and wreck ships is only air moving. But if the air is still and quiet, how can we tell that it is present? Certainly not by seeing it, because air is invisible, but by making an experiment we at once learn something new about it.

9. What the Air contains.

Experiment 6.- Here I have a bell-jar open at the bottom and furnished with a neck, and a

Fig. 1.

cork at the top (an old bottle with the bottom cracked off will do very well). I will put the bell-jar into this basin of water, but first we must float on the water a little china dish with a small bit of dry phosphorus as big as a pea on it, and light the phosphorus with a match. Phosphorus is a very dangerous substance, and much care must be taken of it, as it is very apt to take fire by itself, and may burn your fingers badly. Now you see the

bright flame of the phosphorus burning inside our bell-jar. After a while it goes out, although it is not all burnt, and we will let the bell-jar stand until it is cool. You notice that the white smoke or fumes which were made by the burning phosphorus have now disappeared, and we have a quantity of air left. But you will see, as soon as the jar has cooled, that there is not so much air left as there was when we began; the jar was full of air to start with, now there is a good deal of water in the lower part of the jar. Let us next ask ourselves, Is the air which remains the same kind of air which we took? We take out the cork of the bell jar and plunge our burning taper into the gas; why, at once it goes out. We light it again with a match, and repeat the experiment; again it goes out when we lower it into the bell-jar. There can be no doubt about this. Something is left after the phosphorus is burnt, which is different from what was in the bell-jar at first. So that you see there are really two different kinds of air in this room: one kind of air (called **oxygen gas**) unites with the phosphorus forming those white fumes, and this disappears and water comes into the bell-jar to take its place; the other kind of air (called **nitrogen gas**), which is left behind, puts out the burning taper, and is therefore quite a different thing from oxygen. Thus we have learnt not only that there is something, which we call air, in this room and in this bell-jar, but that there are two separate things (both invisible gases)

called oxygen and nitrogen. What a great deal so simple an experiment may teach us! Science is always simple and plain when we go carefully forward, and when we make sure to understand each step we take.

AIR. § IV.

10. What goes on when we breathe the air?

We now know that whenever a candle or other thing burns in the air a chemical union is going on between the substances composing the candle or the other thing, and the **oxygen** of the air. The burning wax candle is producing carbonic acid and water, because the carbon and hydrogen contained in the wax are uniting with oxygen; we must light the candle before it will burn, or we must start this union. The candle flame is hot because this oxidation is going on: when you blow the candle, the flame is cooled and goes out, the wax no longer combining with the oxygen.

The oxygen of the air is as necessary for the life of men and animals as it is for the burning of candles. You know that we must have fresh air to breathe: if we do not get enough fresh air we shall be suffocated and die. There are many dreadful stories told of people being suffocated on board ships in storms when the hatchways had been nailed down to prevent the waves from sinking the ship, or in coal mines, or in

wells where foul air had collected. Now let us ask the question, What is going on when we breathe? Do men and animals produce any chemical changes in the air which they breathe like the burning candle or phosphorus? Here a simple experiment will soon plainly answer this question.

EXPERIMENT 7. – Pour some clear lime-water into a glass, and then blow the air from your lungs through

the liquid by means of a straw or a piece of glass tubing. You will soon notice that the lime-water has become milky; exactly the same effect has been produced as was noticed when you burnt a taper in a bottle (Experiment 1); the milkiness shows that chalk has been formed, and the chalk shows that carbonic acid gas has come out of your lungs. For this carbonic acid gas did not go into your lungs with the air, because if you shake up lime water with common air it does not get milky. Hence we learn that the

air you **breathe out** differs from the air which you **breathe in** by containing large quantities of carbonic acid gas. Where does this gas come from? It is the same gas which is always formed when a candle burns. Can our bodies be really burning like candles? You will say at first, No, certainly not, for we do not feel hot like a candle flame. But then you will think, Why! I am really hotter than the table or walls or anything which is not alive. So is the dog, and the cat; so are a great number of animals. But when these animals cease to live, or when they cease to breathe, then they become cold like the walls or the table. The **breathing of animals** is therefore **an act of oxidation.** The air passes through the nose and mouth down the throat into a fine network of very small tubes called the **lungs.** At one side of these thin tubes is the **air**, at the other side is the **blood**, and the oxygen of the air passes through the thin sides of these air-passages into the blood, and there it combines with the dead carbon contained in the body. You may easily convince yourself that animal bodies contain carbon, by noticing that a piece of meat becomes **charred**, or converted into charcoal or carbon, when it is partly burnt by placing it before a hot fire. Now this carbon of the body forms carbonic acid when it unites with oxygen, just as the carbon of a piece of wood does. And the heat which is given off in each case is exactly the same. If we were to get a bottle full of pure carbonic acid gas from a burning taper, and the same

sized bottle full of pure carbonic acid gas from our lungs, the heat which is produced in our body by the combustion of our animal carbon, in order to get this much carbonic acid gas, is equal in amount to that given off by the burning of the candle to get the same quantity of the same gas. We do not see any flame in the animal because the heat of combustion is spread all over the body; if the oxidation took place in as small a space as the wick of a candle, then we might expect to see a flame, but as it is, the blood running throughout the body simply keeps the whole warm.

Thus by another experiment we have learnt, (1) that animals take in the oxygen of the air into their lungs; (2) that there the oxygen goes into the blood; and (3) that there the oxygen is used to burn up the waste carbon of the body forming carbonic acid, and thereby giving rise to animal heat.

AIR. § V.

11. **Let us next ask what sort of action do Plants exert on the air?**

Again we must have recourse to experiment, but this time one which will last some days.

Experiment 8.—If you sow some mustard or cress seeds on a piece of common flannel kept moist by a little water contained in a plate, the seeds will soon begin to sprout, and if you keep them in the light they will continue to grow, until after some days you

may have a fair crop of mustard and cress plants. Whence did the growing plants get the materials necessary to form their stalks and their leaves? not from the flannel, for that remains unchanged; not wholly from the seeds, for the plants weigh much more than the seeds; not from the water alone, because the plants are building up stalks and leaves containing carbon, and this substance is not present in water. Where does the plant get the carbon it needs? From the air, we answer. Our previous experiment showed us that animals are continually giving out carbonic acid gas in their breath, and we are therefore sure that this gas must be present in the air, although perhaps in small quantity. Let us see whether we can find out that there is a little carbonic acid in common air.

Experiment 9.—Pour a little clear lime-water into a shallow saucer or clean plate, and allow it to stand for a few minutes either in a room or in the open air, then move it about and pour it into a glass. You will notice that a thin white film has been formed on the top of the lime-water. This film is chalk or carbonate of lime, derived from the union of the carbonic acid contained in the air with the lime. It takes some time to form, and then only is seen in small flakes or films, because there is only a very little carbonic acid gas in the air. But this small quantity of carbonic acid serves as the main food of all the plants which grow on the earth.

12. Growth of plants.

If the plant uses carbonic acid as its food, and produces therefrom wood, and fruit, and leaves, all of which need carbon to form them, what becomes of the oxygen which we know is united with carbon to form carbonic acid? We must as usual go to nature for an answer and make an experiment.

Experiment 10.—Take a bunch of fresh green leaves—water-cresses answer well—and place them

Fig. 8.

in a large bottle, then fill the bottle quite full of fresh spring water, so that no bubble of air is left in the bottle. Turn the mouth of the bottle, full of water and leaves, downwards into a basin full of water, and place the bottle and the basin in the strong sunlight for an hour or two. If you then carefully examine the leaves, you will see that they are covered with small bubbles, and that more of these bubbles have collected at the top of the bottle.

These bubbles consist of pure oxygen gas[1] derived from the carbonic acid contained dissolved in the spring water.[2] Plants have the power in presence of sunlight of decomposing the carbonic acid of the air, taking the carbon to build up their stems, leaves, &c., setting free the oxygen as a gas.

Experiment 11.—You probably know that green plants will not grow in the dark, and you may understand why this is so, if you repeat the last experiment; but instead of placing the bottle of spring water containing the leaves in the light, put it in a dark cellar. You will then not notice the formation of any bubbles of oxygen gas, even after standing for many hours, and you will learn that sunlight is necessary in order that green plants may decompose carbonic acid, and therefore necessary for their growth.

13. Action of animals and plants on the air

Let us now reflect for a moment on the different changes which animals and plants produce in the air. We have learnt that both these sets of living beings are constantly causing important chemical

[1] This can be shown if the gas is present in sufficient quantity by transferring the gas to a narrow test-tube, and exhibiting the re-ignition of a red-hot splinter of wood.

[2] By adding lime-water to the spring water a milkiness of chalk will be produced, showing the presence of carbonic acid in the latter.

alterations in the air, so that chemistry has not only to do with the changes which occur in dead or inanimate matter, but also is nearly concerned in the very life of every animal and vegetable existing on the globe. Now we have learnt that

Animals inhale (breathe in) oxygen, and exhale (breathe out) carbonic acid—give off heat—are constantly burning.

Plants inhale carbonic acid gas, and exhale oxygen,—take up the sun's light and heat, without which they cannot grow,—are constantly forming material which will burn.

Here you see that the part played by the animal is exactly the opposite of that played by the plant. The animal renders the air impure by constantly breathing out carbonic acid; the plant constantly tends to purify the air again by taking up the carbonic acid and breathing out (by means of its leaves) oxygen gas. This balance between animal and vegetable life is well illustrated by the Vivaria, now so common, in which small water-animals and water-plants grow in a globe shut off from the air; the carbon contained in the carbonic acid evolved by the animals is set free by the plants, and is just sufficient for their growth, whilst the oxygen at the same time liberated serves for the respiration of the animals.

WATER. § VI.

14. What is Water made up of?

You have learnt in the Introductory Primer (Article 13) that if I put a piece of ice into a glass and heat it over a lamp, the solid ice changes into liquid water, and, if I continue to heat the water, it begins after some time to boil and forms gaseous steam. This steam is an invisible gas, quite different in its properties from the liquid water which is got by cooling it. Let us see if we can get anything else from water than steam, by treating it in different ways.

Experiment 12.—Instead of sending heat into the water, by which I only get it to boil, I will send a stream of electricity through the water (to which I will add a few drops of acid to allow the electricity to pass more easily). I use four cells of a Grove's battery (a description of which is found in Article 87 in the Physics Primer), and the electricity will pass into the acidulated water by the two platinum wires passing through the cork at the bottom of the glass funnel, when I join these with the copper wires from the battery.

What do we notice the instant we join the wires? The water near the wires seems to boil, or effervesce, owing to small bubbles of gas being given off. These bubbles cannot be steam, because steam, if formed near the wire, would at once be condensed by the water near it, and these bubbles rise up through the

cold water. Let us try to collect these gases; and we will see whether the bubbles from the one wire are the same as those from the other. For this purpose we will put a small test-tube filled with water over each wire, so that the bubbles as they rise round the wire must be all caught by the tubes, which are both of the same size. What do we notice as the gases collect? Why, that in one tube we are

Fig. 8

getting just twice as much gas as in the other. Now one of the tubes is quite full of a colourless invisible gas, whilst the other is just half full. Next let us see what sort of gas we have got. I take the tube which is half full of gas and lift it out of the water by placing my thumb on the mouth, and then, turning it up, I bring a red-hot bit of wood into the gas. The red-hot splinter at once bursts into flame! What must we conclude? That the gas is oxygen, for we

have learnt to recognise this substance by its relighting a red-hot taper.

Now we will try the same experiment with the other tube, but we will hold its mouth downwards, for a reason which we shall soon understand. The red-hot splinter goes out and re-kindle; but if we now bring the flame of a taper to the mouth of this tube, the gas itself can be lighted and is seen to burn with a pale blue flame. Here we have to do with something quite different from oxygen; this gas is called hydrogen.

If we repeat this experiment with the water, we shall always get the same result, and by no other treatment that we know of can we get anything else but oxygen and hydrogen from water. Hence we conclude

(1) That by means of Electricity we can split up or decompose water into two perfectly different substances, oxygen and hydrogen gases; and into nothing else.

(2) That water, when thus decomposed, yields twice as large a volume of hydrogen as it does of oxygen.

15. We can get hydrogen from water in several other ways.

Experiment 13.—If I throw a small pellet of the metal potassium,[1] as large as half a pea, on

[1] This substance must be kept in rock oil, and not exposed to air or moisture. It may be cut with a penknife.

to the surface of water contained in a basin, and see that the metal, being lighter than water, swims on the surface, but also that the moment it touches the water a flame arises round the metal. This flame is caused by the hydrogen of the water which is set free and takes fire and burns. Now if this flame is due to burning hydrogen, what becomes of the oxygen of the water? The oxygen

Fig. 10

unites chemically with the metal potassium to form the alkali potash; this we can see by adding a little red litmus solution to the water on which the potassium has been thrown, when we notice that the red colour is changed to blue, owing to the presence of the alkali[1] potash. If I throw a small bit of the metal sodium onto water, this will also swim on the surface and set free the hydrogen and form with oxygen the alkali soda; but the heat is not sufficient to light the hydrogen.

16. How hydrogen can be collected.

Experiment 14.—By making the last experiment in rather a different way, we can collect the hydrogen

[1] For the meaning of this word see page 91.

which we saw burn on the surface of the water. For this purpose we will mix a few small pieces of sodium with a little dry mercury or quicksilver, the well-known bright shining liquid metal. If we press the bit of sodium with a pestle under the surface of the mercury contained in a mortar, the two metals will unite, and we get a mixture of the metals, or an amalgam, as it is called. Now pour this liquid amalgam into a basin of water, having inverted a bell-glass or large test-tube filled with water over the

centre of the basin. The sodium will gradually decompose the water, forming soda, and the hydrogen of the water will be liberated and will collect in the inverted glass. After a certain amount of the gas has been formed, the presence of hydrogen may be shown by bringing a light to it and seeing that it burns with a pale flame.

WATER. § VII.

17. Hydrogen got in other ways.

Many other metals have the power of decomposing water, taking the oxygen to form an oxide of the metal, and setting free the hydrogen. Some metals, like potassium and sodium, are able to do this (as we have seen) in the cold;—other metals, such as iron, must be heated red-hot before they can split up water into its two constituent parts, uniting with the oxygen to form oxide of iron or iron-rust and setting the hydrogen gas free. Some metals, as zinc and iron, although they do not split pure water up into oxygen and hydrogen in the cold, are able to do so if some acid[1] is present.

Experiment 15.—If we put a few zinc clippings into a flask containing some water, and if we then carefully pour in a little sulphuric acid (oil of vitriol), we shall soon notice an effervescence, due to the escape of gas. Then we fit tightly into the neck of the bottle a cork furnished with a bent glass tube. The hydrogen, as it is formed from the acidulated water by the zinc, will pass through the tube; and the bubbles of gas may be collected in a bottle full of water placed in the trough. Care must be taken to allow all the air to be displaced from the generating flask before the gas is collected. This is done by trying when the gas, caught in a small test-tube over

[1] For the meaning of this word see page 81.

the water, burns quietly on being brought mouth downwards to a flame. When the supply of gas

Fig. 18.

begins to lessen, it can be again increased by pouring a little more acid through the tube-funnel without taking out the cork.

Having thus collected three bottles full of hydrogen, which are kept by placing their mouths downwards in small saucers filled with water, let us see what experiment can tell us about the properties of this interesting gas got from water.

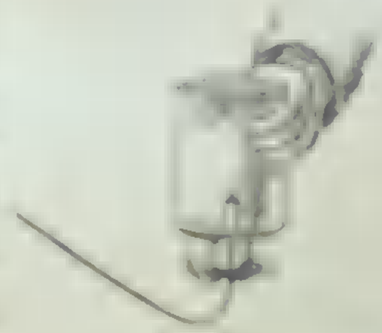

Fig. 19.

18. Hydrogen burns and is lighter than air.

Experiment 16.—Take one of the bottles full of hydrogen and hold it mouth downwards in the air, and then push a lighted taper fixed on a wire into the bottle. We shall see that the hydrogen gas takes

fire and burns at the mouth of the bottle, but that the flame of the taper inside the bottle has gone out When we bring the taper out again, it will be re kindled by the flame of the burning hydrogen, but will be extinguished when plunged into the gas. What does this experiment teach us?

1. Hydrogen is inflammable, and burns with a pale blue flame.

2. Hydrogen does not support the combustion of a taper.

EXPERIMENT 17.—Turn upwards the mouth of a bottle filled with hydrogen, and then quickly bring a

Fig. 14.

light to it; the hydrogen will burn with a much larger flame than when the bottle is turned mouth downwards. This is because hydrogen is much lighter than air. For this reason we can pour hydrogen upwards. Take a bottle filled with air and another filled with hydrogen, and hold the bottle of air above the bottle of hydrogen as shown in Fig. 14, when the lighter hydrogen will pass upwards from the lower into the upper bottle displacing the air. Then bring the top bottle with its mouth downwards

to a light, when the hydrogen will take fire and burn (sometimes with a slight report from admixture of air). Let the bottom bottle stand for a few moments mouth upwards on the table and then bring a light to it. All the hydrogen has gone, and the bottle is filled with common air. This experiment shows that hydrogen is much lighter than common air. Indeed, it is the lightest substance we know of, and is therefore used for filling balloons.

19. Water formed when hydrogen burns.

Let us next try to find out what is formed when hydrogen burns in the air.

EXPERIMENT 18.—Instead of the bent tube fixed in the flask used to generate the hydrogen, attach a straight one with a pointed end to act as a jet. After you are quite sure that all the air has been driven out of the flask (and this can be ascertained by hanging a dry test-tube onto the pointed tube and seeing that the hydrogen which then will fill the test-tube burns quietly on lighting it), bring a flame to the jet. The hydrogen will burn with a steady flame; now bring over this flame, as in Experiment 2, a dry glass, when a deposit of dew, or small drops of water, will be noticed. This shows that when

Fig. 15

hydrogen burns it unites with the oxygen in the air to form water.

Experiment 19.—Now let us see whether anything else is produced when the hydrogen burns. We will allow the flame to burn inside a large bottle or flask, and then add to the air in which the flame of hydrogen has burnt some clear lime-water (as in Experiment 1). No milkiness is, however, produced, and we therefore see that no carbonic acid gas is formed by the burning of hydrogen; and so, by making further experiments, chemists conclude that when hydrogen burns in the air nothing but pure water is formed. By arranging Experiment 18 so as to keep the glass cool for some time, we may collect a glass full of water, and we find that this is perfectly pure water and quite free from soot, which was present in the water got by burning the candle (Experiment 2).

Now we learn where the water came from when the candle was burnt; the wax must contain hydrogen, and the water is formed by the union of the hydrogen of the wax with the oxygen of the air. So you see that in gaining knowledge about water we have learnt about air, for we have seen that water is made up of two different kinds of airs or gases, so closely are the parts of natural knowledge linked together.

WATER. § VIII.

20. Composition of Water.

Next let us try to learn more about the composition of water. We have found (Experiment 3) that oxygen is contained in the air mixed with nitrogen (Experiment 6). The oxygen exists in the air in the free state as a colourless gas; in water the oxygen is chemically combined with hydrogen, and when united together these two gases form liquid water. We also know that (Experiment 12), when water is decomposed, two volumes of hydrogen gas are obtained for every volume of oxygen. It now becomes an important question to ask what weight of oxygen and hydrogen unite together to form water. How many pounds of hydrogen and how many pounds of oxygen go to form so many pounds of water? You must take care to distinguish between volume and weight. To ascertain the composition of water with accuracy is not easy, and it is so important that many chemists have devoted months or years to find out the exact weights of hydrogen and oxygen which are contained in water. We may copy their experiments by what I may call a rough model, which, if it is rather more difficult than the former experiments, is of great interest, and will be understood by all who read the description and try the experiment with care.

EXPERIMENT 20.—In the Introductory Primer (Article 21) the pupil has learnt the use of scales or the balance, and knows how the weight of a substance is determined. It may, however, be well for him to learn how to weigh for himself, and to know the number and value of the weights.

I have here a small pair of common apothecaries' scales and a set of weights. A is a tube of hard glass with a bulb blown onto it, and into this I bring about

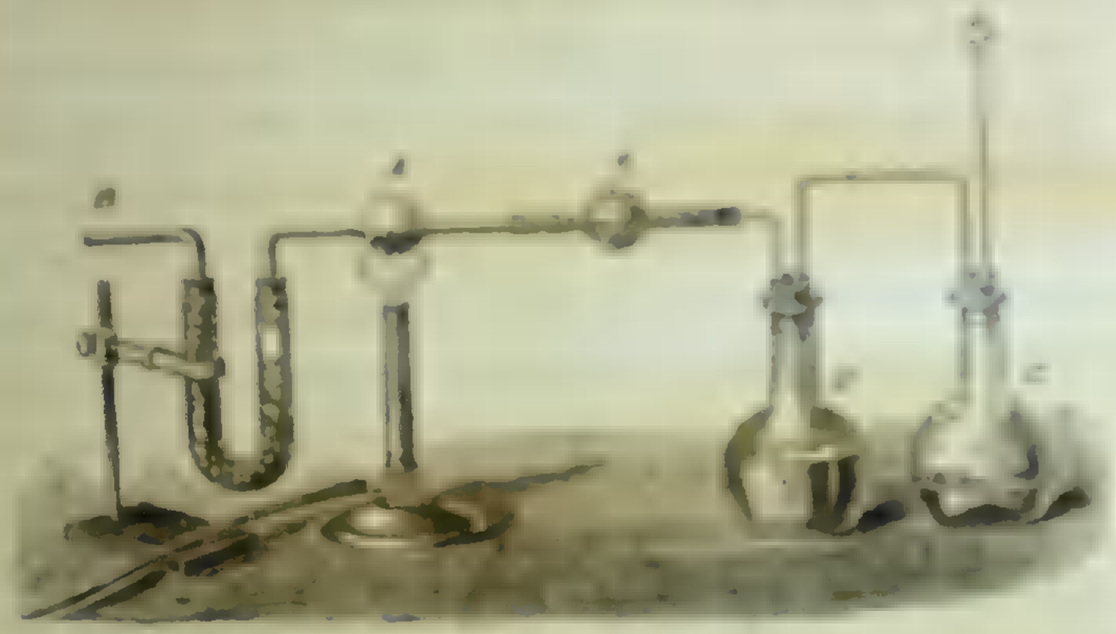

Fig. 16.

half an ounce of black oxide of copper; B is another tube into which the bent end of tube A can be fixed; this tube is filled with white calcium chloride, a substance which eagerly absorbs moisture; C is a flask for generating hydrogen from water and dilute acid by means of zinc; D is a little wash-bottle containing some oil of vitriol, which will dry the hydrogen as it bubbles through; E is another tube containing calcium chloride, through which the gas must pass,

and thus get quite dry before reaching tube A. In making the experiment we must first get the weight of the tube A and the copper oxide, by taking out the corks and separating it from the tubes E and B, then carefully putting it on one pan of the scales and placing weights in the other until it is exactly balanced. The precise weight of the tube and the copper oxide must then be written down. Next carefully weigh the tube B in the same manner, and set its exact weight down on paper.

Now put the two tubes back into their places, as before, taking care not to lose any of their contents; then pour some sulphuric acid down the funnel tube onto the zinc, and allow the hydrogen to bubble through the whole apparatus and over the copper oxide. Put a dry test-tube over the turned-up end of tube B, and collect the hydrogen as it comes out; try from time to time whether the air is driven out from the apparatus by bringing this test-tube (mouth downwards) to a flame. After several trials the hydrogen in this test-tube will be found to take fire and burn quietly. As soon as this is the case, put a small gas-flame under the tube containing the oxide of copper. As long as this remains cool no difference can be observed in the black oxide, although the hydrogen is passing over it; but when it is heated, a change begins at once. The black colour changes to a bright red metallic tint, and drops of water are seen to condense on the cool part of the inside of the tube. As the whole bulb gets warm the water will

be carried into the tube B, and there it will be held by the calcium chloride, a moisture-absorbing substance. Let the hydrogen pass over the heated bull until all the black colour has disappeared, and then take the lamp away. Whilst the bulb is cooling let us find out what has happened. The hydrogen has combined with the oxygen of the copper oxide to form water which has passed on, partly as water and partly as steam, into tube B, where it all collects, none of it escaping into the air; the red powder left in the bulb is pure metallic copper. Now let us weigh the two tubes again. In the first place, tube A weighs less than it did before, because it has lost something (viz. the oxygen) which has weight. Secondly, the tube B weighs more, because it has gained something (viz. the water) which has weight. Now then we have:

	Grains.
1. Weight of tube A, containing the copper oxide, before experiment	1056
2. Ditto, after experiment	1016
The difference between these weights is the loss due to escape of oxygen	40
3. Weight of tube B before experiment	803
4. Ditto, after experiment	848
The difference between these weights is the gain of weight of tube B due to absorption of water	45

What must we conclude from this most important

experiment? The answer is obvious—That 45 parts by weight of water contain 40 parts by weight of oxygen; and as water contains nothing but hydrogen and oxygen, it must contain the difference, or five parts by weight of hydrogen; or to two parts of hydrogen by weight, water contains sixteen parts of oxygen.

These same proportions are always found if the experiment is carefully made. And thus we learn the first great law of chemical combination, that the same chemical substance always contains the same quantities of its components. Eighteen parts of water are always made up of 16 parts of oxygen to 2 parts of hydrogen by weight.

WATER. § IX.

21. What is the difference between sea water and fresh spring water?

We know that sea water is salt, or it contains salt dissolved in it. It is easy to make salt water by throwing some common salt into water; the solid salt disappears or dissolves, and the water now tastes salt.

Experiment 21. We can only get rid of this saltness by distilling the water, that is, by boiling the water and collecting and cooling the steam. This we can do best in a glass retort (fig. 17). We boil the water with a lamp, the steam comes off and

passes down the neck of the retort, and into the flask, over the outside of which some cold water runs to cool the steam inside the flask. The distilled water has no longer a salt taste; it is pure water, for all the solid salt remains behind in the retort, as we may see when we boil off all the water. This plan of getting fresh water from salt sea water is

much used on board ship, and the water thus got is good for drinking purposes. Sometimes spring or fresh river water contains common salt dissolved in it, but in such small quantities that it does not taste salt. The chemist, however, has a better mode of seeing whether water contains salt than judging by his tongue of the saltness: he uses a more delicate test than this. An experiment will show this.

22. Testing for salt

Experiment 22.—Take two large clean glasses, full of distilled water or clean rain water; drop into one of these a grain of common salt as big

as a pin's head; stir it well up until this salt is quite dissolved. Now try whether you can taste the salt. You will not be able to do so. Now take the bottle labelled "Silver Nitrate," and carefully pour three or four drops of the liquid into the middle of each of the glasses of water. Soon a white cloud will be seen floating in the water to which the grain of salt was added, whilst the pure water remains clear and bright. Thus, then, the chemist by his testing and experiments can ascertain the presence of substances which the common observer overlooks or cannot see, and you will afterwards learn what happened here when this white cloud was formed. (See page 105.)

23. Solution and crystallization.

Many other solid substances dissolve readily in water sugar, soda, alum, for instance. Others dissolve a little, such as gypsum or plaster of Paris. Others again do not dissolve at all in common water, such as flint, sand, or chalk.

Experiment 23.—If we take two ounces of soda crystals, commonly called washing soda, and add to them one ounce or about a test-tube full of hot water in a glass, the crystals will all dissolve on stirring. If we allow this solution of the soda to cool, we shall notice that particles of the solid soda begin to make their appearance on the sides of the glass in bright shining little masses called crystals, or the solution is said to crystallize.

If you notice the shape of the crystals, you will find them all alike, only some larger than others.

Fig. 11.

Now try the same with one ounce of alum and one ounce or a test-tube full of water; the crystals of alum will make their appearance by degrees.

Form of a Crystal of Washing Soda.

Fig. 12.

They have quite a different shape from the crystals of soda, as you see in the drawings.

Experiment 24. You may do the same with bluestone or sulphate of copper, and the blue crystals will slowly form of the shape shown in the drawing.

Form of a Crystal of Alum.

Form of a Crystal of Sulphate of Copper.

Now mix up half an ounce of powdered alum and half an ounce of powdered sulphate of copper, and having mixed these powders well together with the mortar and pestle, dissolve them in one ounce of hot water, and let the solution cool. Carefully notice what separates out. You will see that the colourless crystals of alum are formed, and side by side with them blue crystals of sulphate of copper appear. The two different salts can thus be separated by crystallization; and if we took time enough, we could pick out all the alum crystals and put them on one side, leaving all the crystals of sulphate of copper. This shows how nature separates out things which are different, and we see that many rocks and minerals are formed in the earth by crystallization.

Thus we find calc-spar, fluor-spar, heavy-spar, fel spar, and quartz, all crystalline minerals which have, in different ways (and we cannot always tell exactly how), been produced in the earth by crystallization.

WATER. § X.

24. Rain is distilled water.

If we think where rain comes from, we shall soon see that rain water is the purest kind of water which we find on the earth. Rain falls from the clouds by a condensation or liquefying of the moisture which is in the air. When the hot winds blow over the ocean, these hot winds take up much moisture from the ocean as vapour or steam, just as the steam passes over from the retort; and when this hot and moist air gets blown to a cooler place, it gets cold and cannot contain so much moisture in the form of vapour as when it was hot, so that this moisture is deposited in drops as rain. Hence rain water is distilled water, and you will see that a gigantic system of distillation is going on all over the globe; and if you reflect for a little, you will understand that every drop of running water on the globe has once been distilled as rain from the ocean, to which it again returns.

25. Suspended and dissolved impurities.

But does the water running from our springs, our streams and our rivers, into the ocean, take anything

else back with it? Why, you will at once say—Yes, certainly, it washes away sand and soil and dirt into the sea. This you can see if you take some river water, even the clearest, and let it stand a little; some sediment will separate out and sink to the bottom. This sand and dirt which the rivers carry out into the sea can be separated by filtration, that is, by passing the dirty water through a piece of porous paper, blotting or filter paper, placed in a funnel as shown in fig. 21, or by filtering through

Fig. 21.

sand or through a sponge or through charcoal, as is usual in the water-filters we employ in houses.

Experiment 25.—Still you will readily understand that only those substances which are suspended in the water as solid particles can thus be got rid of. No process of filtering, however perfect, can get rid of dissolved matter. Add a few drops of blue indigo solution to water, and filter this through a paper-filter; you will not be able to get rid of the colour, because the indigo is dissolved in the water. In order to get the water free from blue indigo, or

anything else dissolved in it, it must be distilled in a retort.

26. Hard and soft waters.

Experiment 26.—The water running back to the ocean takes, however, away with it substances in solution. If we boil down a pint of any clear spring- or filtered river-water in a clean porcelain basin so as to drive off all the water, we shall always find that some solid residue is left; whereas, if we boil down a pint of distilled water, no solid residue will remain. This is because the rain water, falling on the ground and trickling through the soil and over the rocks, always finds something which it can dissolve, and which it takes away with it. Thus the sea is constantly having soluble matter carried into it from the land, and it is becoming, though very slowly, more impure.

Of course the kind of substances which the rain water takes up in solution on its road to the sea will depend upon the kind of rock or soil through which it passes, and also, you will say truly, upon the sort of dirt which people living near throw in. Some springs are even more salt than the sea itself, because the water which supplies them flows over a layer or bed of solid salt inside the earth.

Many spring and river waters are said to be hard, whilst rain water is always soft. A water is hard when soap does not at once form a lather with it, but a sediment or curd is produced. Let us see if we can

make out why this is, and for this purpose we must try an experiment.

27. What makes hard water?

Experiment 27.—Take a little powdered gypsum or plaster of Paris, and put a pinch of this into a large bottle full of distilled or rain (soft) water. Then shake the water and the powder well together for some time, and afterwards filter the whole through a paper filter. The water will be quite clear, but it has become hard; this you may tell by trying to wash your hands with soap in this water, or, better, by first dissolving some soap in hot water (as is done for making soap bubbles), and then dropping a little of the clear solution of soap into the hard water, when you will find that the soap does not make the water lathery but curdy, until after you have added more soap solution, when the froth appears.

Hence we learn that spring and river water may become hard by containing gypsum or sulphate of lime in solution. If you boil the water which you have thus hardened with gypsum, no change will occur; the boiled water on cooling will be as hard as before.

WATER. § XI

28. Hard chalk water is softened by boiling.

There is, however, another kind of hard water about which we have to learn. We have already learnt (Experiment 7) that the air from the lungs

contains carbonic acid gas, and that when you blow the air out of the lungs through some clear lime-water a white insoluble powder called chalk or carbonate of lime is formed in the water, which soon becomes quite milky.

EXPERIMENT 28.—Repeat Experiment No. 7, but blow a great deal more air through the lime-water than you did before. If you go on long enough—perhaps five minutes—you will see that the milkiness begins to disappear, and the water becomes clearer; you may not be able to get it quite clear, but you can now filter the liquid through a paper-filter. A clear water will come through, which, however, you will find (by trying the soap experiment) is quite hard. What now has happened? Why, the carbonic acid from your lungs has the power of dissolving the chalk (which you know does not dissolve at all in pure water); and thus we get a clear water which is hard, because it contains chalk dissolved in carbonic acid. Now you know that carbonic acid is a gas; if we boil the water which we have just hardened, all the carbonic acid gas will be driven off, and the chalk which was dissolved in the carbonic acid will be thrown down as a white powder. This you can easily see by boiling the hardened water in a glass flask. If you filter this boiled water, you will find (by the soap test) that it is no longer hard, but has been softened by boiling. Another way in which water hard with chalk dissolved in carbonic acid can be softened, is to add clear lime-water to the hard

water; the lime unites chemically with the carbonic acid, forming chalk or carbonate of lime, which precipitates or falls down as an insoluble powder together with the chalk originally present. By this latter plan hard chalk waters can be easily softened on a large scale.

29. **The water of different rivers differs in hardness.**

The hard chalk water then differs from the hard gypsum water, inasmuch as we can soften the former by boiling or adding lime, whilst the latter cannot be thus softened. Now if the rain water trickles down through rocks containing gypsum, the springs and rivers in that district (as the river Trent), are hard with gypsum. The rain, however, although purer than any other form of running water, is not quite pure, for it contains carbonic acid gas dissolved in it, which it gets from the air (see Experiment 9). Thus it happens that when rain water passes through a limestone district, or through chalky rocks or soil, the carbonic acid dissolves some of the chalk, and we get (as in the Thames) water hard from chalk. The crust or deposit often found in kettles or boilers is generally nothing more than this chalk, which slowly separates out on boiling the water and sticks to the bottom or sides of the kettle as a hard crust.

If the rain passes through a granite district (as the Dee in Scotland), where there is no chalk or

gypsum, then the water remains a soft water, because it cannot take up and dissolve any hardening substance from the soil.

30. Surface water of towns impure.

If water flows through a town or near sewers, it becomes impure from admixture with the drainage from houses, and is rendered quite unfit for drinking purposes; indeed, it may thus become poisoned, and the cause of disease. Sometimes the most clear and sparkling water may contain sewage impurity, if drawn from the neighbourhood of towns or drains. It is for this reason that most of our large towns are now supplied by pure water collected in reservoirs at a distance from the towns, and brought into each house by iron or lead pipes, so that it cannot become spoilt by mixing with drainage water.

31. Water dissolves gases.

Gases will also dissolve in water, some kinds much more than others. We have seen that carbonic acid gas from the air dissolves in rain water, and in soda water there is so much of this gas dissolved, that when the cork is taken out the gas flies out. Even the air dissolves in water, and the dissolved oxygen gives to spring water its pleasant fresh taste. If you boil the spring water, the dissolved air flies off, and when cooled again you will find the water tastes flat and insipid. The dissolved oxygen in river water and also in sea water

is essential to the life of fishes, for they need oxygen for their breathing as much as animals which live in the air. Where do they get the oxygen?—not from the oxygen which is combined with hydrogen to form water, but from the oxygen gas which is dissolved in the water. Fishes pass large quantities of water through their gills, and in passing through they extract the oxygen. If you throw a live fish into cold water which has been well boiled and not exposed to air, the fish will die, because there is no dissolved oxygen in the water for it to breathe.

EARTH. § XII.

32. About Earth.

We have now learnt a little about Fire, Air, and Water; let us next see what we can learn about Earth, or the solid matter of which our globe is made up.

Fire, Air, and Water are somewhat simple things:—

Fire is the heat given off when bodies burn or combine chemically.

Air is the mixture of two gases, oxygen and nitrogen, which exists around us and which we use in breathing.

Water is the liquid which surrounds the Earth and is composed of two gases, oxygen and hydrogen, chemically combined together.

Earth is a much more difficult and complicated

subject, and we can only learn a very little of the Chemistry of Earth in this book.

To begin with, the solid Earth, as we call it, is only solid because it is not hot. All solid things can be melted and made liquid, if only they are made hot enough. Hard iron can be melted in a furnace and poured out like water, glass can be melted and cast into plate: so all the solid rocks and stones can be melted and made liquid, like water, and even boiled away like water, and driven off in vapour, if we only heat them enough. In reality, the inside of the Earth is hot enough to melt rocks; and in volcanoes (or burning mountains) we often see that white hot liquid rock (called lava) is poured out, and sometimes runs out over a town, as at Herculaneum, near Mount Vesuvius, and burns up and buries all that comes in its course.

Let us take up some different kinds of earthy bodies, and see what they are made of and what we can get from them.

33. Preparation of carbonic acid gas from chalk.

Experiment 29.—Take a few pieces of chalk, or limestone, or marble (for these are all the same chemical substance); put them into a bottle fitted with a cork, bent tube, and tube funnel; pour some water into the bottle, and then add a little "hydrochloric acid." You will notice that a bubbling takes place near the chalk, and if you dip the end of

the bent tube under water contained in a glass, bubbles of gas will pass through the water. Change this glass for an empty bottle, and let the gas pass from the tube into this bottle. After a few minutes plunge a burning taper into the bottle into which the gas has passed, it will be instantly extinguished. Next pour some clear lime-water into the bottle, it will be turned milky. Then put the burning taper at the bottom of another bottle containing air and pour the gas from the other bottle (as if it were water) onto the burning taper; soon you will see

Fig. 12.

that it is put out. What is the gas we have got from chalk or marble? It is carbonic acid gas, for it puts out a flame, it makes lime-water milky, and it is so much heavier than air that we can pour it from vessel to vessel like water. This carbonic acid gas is combined in the chalk, and when we add another acid, this gas comes off. What else does the chalk contain? Let us put a piece of chalk, or limestone, or marble, into the fire, so as to heat it gently, and

then notice what happens. If we take the stone out of the fire, we see that it has been altered by being burnt. If we pour acid upon it, bubbles are not given off; it has therefore lost its carbonic acid by being burnt. But if we pour water on it, we notice that the solid substance falls to powder and becomes hot enough to make the water boil. Now what has happened is, that, by heating, the limestone or marble has lost its carbonic acid and **quicklime** is left (and this is what happens in the lime-kilns); and when we pour water onto quicklime, it is **slaked**, or combines with the water. Hence we have learnt that **chalk** or marble is a **chemical compound of lime and carbonic acid**, and also that from an earthy substance we may be able to get a gas.

EARTH. § XIII.

34. Preparation of oxygen gas.

EXPERIMENT 30.—Next we will take another earthy substance, not so common as chalk, but one which will teach us some important lessons. We will put a little of this red powder out of the bottle labelled "Mercury Oxide" into a little tube of hard glass, and fasten to it a cork and bent glass tube, and fix this in a holder. Then heat the red powder—it will soon get dark coloured, and then a bright white shining substance will be deposited on the cold sides of the tube. Bubbles of gas will be seen to come off at the end of the tube, and these can be

collected in a tube filled with water placed in the trough. We can then test to see what this gas is, and by using a red-hot splinter of wood we shall see that this gas is oxygen gas, because the red-hot spark is at once rekindled. Now we may go on heating the red powder until it has all disappeared or is all converted into oxygen gas and the bright shining substance which collects in the tube. Let us find out what this substance is. When all the red powder has disappeared from the bottom of the tube

Fig. 8.

we take the tube and cork out of the water to prevent the water going back into the tube when we take away the lamp. Now when the whole is cold, scrape down the shining deposit with a little piece of wood, and you will find that bright liquid drops of metal can be shaken out of the tube. This metal is **mercury or quicksilver.**

Now we have learnt that this red powder can be split up into two substances by heating it: (1) Oxygen gas; (2) The metal Mercury. Notice only

does this red powder, wherever it may be got from, always yield mercury and oxygen on heating, but the same weight of this red powder always gives the same volume of oxygen and the same quantity of mercury.

You see why this is called oxide of mercury—because it is a chemical compound of oxygen and mercury. Nobody could tell that this red powder contained these two quite different substances; this is a thing which can only be found out by trial or experiment. Chemists have found by weighing the red powder, and the mercury and oxygen which it yields, that 216 pounds' weight of red oxide of mercury always yields 200 pounds of metallic mercury and 16 pounds' weight of oxygen. So here again we have proof that the same chemical compound always possesses a fixed and unalterable composition.

35. Metals become heavier by oxidation.

Almost all the earthy and solid rocks and bodies which we see around us contain oxygen combined with something else, forming oxides. Thus all the metals, such as iron, copper, silver, zinc, lead, will combine like mercury with oxygen to form oxides, and the oxide will always be heavier than the metal contained in it, because there is also the oxygen, which has weight.

Experiment 31.—To show that this is the case, take a small horseshoe magnet, and dip the ends of

the magnet into fine iron filings, which will stick to the magnet, forming a kind of small brush. Then hang up the magnet, with the filings on it, on one end of the beam of the scales, and accurately balance the other pan with weights. Now place the flame of a lamp underneath the filings as they hang on the magnet, and you will see that the filings take fire and burn—that is, they are combining with the oxygen

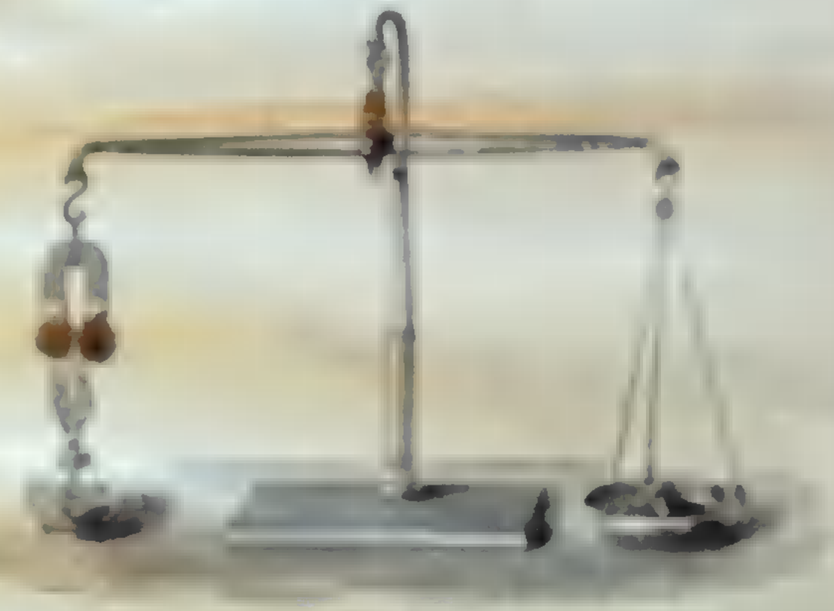

Fig. 24.

of the air to form oxide of iron, which is the same thing as iron rust; and, if you get enough filings to stick to your magnet, you will see that the scales will no longer be balanced, but that the iron rust is heavier than the filings.

36. Metals contained in earthy substances.

So we learn from these two last experiments that an earthy-looking substance may contain a bright

metal. Let us make one or two more experiments to show this.

EXPERIMENT 32.—Take a small crystal of "blue stone," or sulphate of copper; dissolve this in some hot water in a test-tube; then place the clean blade of a knife, or any piece of bright iron, into the blue liquid. In half a minute take out the bright iron and you will see that it is coloured red where it has dipped in the blue liquid; and if you rub this you will get the bright red colour of metallic copper. Put the iron back again, and leave it for some time in the

FIG. 31.

blue liquid, when you will find that the blue colour will have disappeared, and much copper will be deposited as a brown powder; and on putting a piece of clean iron in the solution, no further red deposit will be formed, showing in two ways that all the copper has been thrown down from solution.

EXPERIMENT 33.—Take half an ounce of the white solid labelled "Lead Acetate," commonly called sugar of lead, and put it with some water into a small clean glass, when it will all soon dissolve; tie a small piece of zinc by a thread to a bit of wood, so that when

the wood rests on the top of the glass the zinc hangs in the liquid. Allow this to stand for some hours,

FIG. 32.

when crystals of metallic lead will be deposited on the zinc, and form a tree-like growth, showing that the white crystals contain metallic lead.

EARTH. § XIV.

37. What is Coal?

Next let us try to find out something about coal. Coal, we know, contains carbon, for we saw that it burns and yields carbonic acid gas by combining with the oxygen of the air. You no doubt all know that coal is got from "pits" or "mines," and it is found sometimes deep down in the earth, and sometimes at or near the surface, and some of you may have seen or even been down a coal pit.

A great deal might be said about coal—about how it was formed, what it contains, what we can get from it, and what we do with it.

1. How was coal formed? Though it may seem strange, it is still true that coal is the remains of plants which grew long ago on the surface, but which have been buried down deep in the earth. When you go down a coal pit you will see the roof and floor of the passages covered with impressions or casts of leaves and other parts of plants, showing that plants have been buried here: and if we slice a piece of coal very thin indeed, we see in the coal itself masses which show us that it has all been vegetable matter.

2. What does coal contain, and what can we get from it? Coal contains carbon: if it burns with a clear flame we know that carbonic acid gas is formed; and if it burns with a smoky flame we can get black soot, or carbon, from the coal. The coal contains, however, other things besides carbon; it contains hydrogen as well.

38. Manufacture of coal gas.

Experiment 34.—Powder a little coal and put it into the bowl of a common long tobacco-pipe; then cover the top well with a stopper of moist clay (made by mixing the powdered Stourbridge clay with a little water), and let the clay dry well. After it is well dried, fasten the bowl of the pipe over the flame of the gas-lamp. Soon a yellow smoke will come out at the end of the pipe, and this yellow smoke will

burn with a bright flame when a light is brought to it. This smoke is **coal gas**, but not purified like that which we burn in our houses. Now push the end of the pipe under water; you will see that bubbles of gas come off, and if you place a test-tube full of water with mouth downwards over the end of the pipe, the bubbles of coal gas will collect, and the tube may be filled with gas, which will burn when you bring a light to it. This coal gas contains carbon, for you may get black soot from the flame of

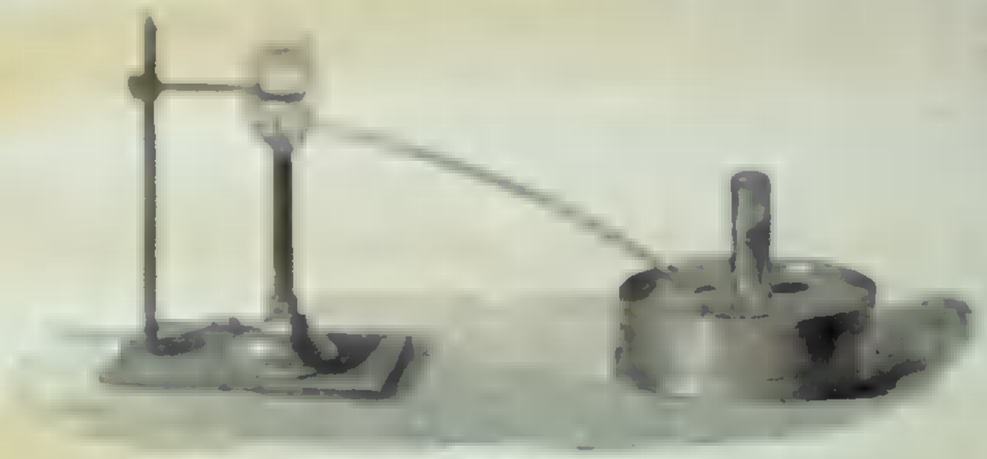

Fig. 27.

this gas when it is burning, and because carbonic acid gas is formed when the gas burns, as you may show with the lime-water test: it also contains hydrogen, because if you hold a dry clean glass over a flame of coal gas, drops of water will collect in the inside of the glass, showing that the hydrogen of the coal gas has united with the oxygen of the air to form water.

You know that coal gas is invisible, because when you turn on the gas-tap you do not see anything

escape although you can smell something. You know that it is inflammable, because it burns when you bring a light to it. But it has many other properties: thus, it is lighter than common air. Try to think what experiments you can make with coal gas to prove that this is the case.

All the coal gas which we use in our towns is made in this way. Instead of tobacco-pipes, large ovens made of brick or sometimes of iron are used, and these are called **retorts**; instead of a pinch of coal, many thousands of tons are made into gas; instead of a test-tube to collect the gas in, enormous **gas-holders** made of iron-plate are used.

Now when the pipe is cold take off the clay, and you will find some grey **coke** in the bowl; this is some of the **pure carbon** of the coal which is left behind. Some of the carbon and all the hydrogen of the coal has gone off as **gas**, or **water**, or **tar**, for all these things are formed when coal is **distilled** or heated as we have done.

There are many different kinds of coal, some of which are not so good for gas-making as others, because some contain more carbon and less hydrogen than others, and therefore give less gas and more coke.

Besides coal gas we can get many other things from coal. Thus we get the **tar** which is used to tar ropes, sails, and fishermen's nets, to prevent them from rotting in the salt water; also **pitch**, which is used for **asphalting** pavements; and, what is more wonderful, we get from coal those splendid bright violet and

crimson colours, mauve and magenta, which you see in the shop windows. How these colours can be got from coal you cannot at present understand.

39. Uses of coal.

Of the importance of coal it is difficult to give you an idea in a few words. Try to think what England would be without coal! Almost all our manufactures depend on our having cheap coal. Our comfort, or rather our very existence, in the winter, depends on our supply of this essential article. Where should we be without railroads or steamboats? and yet these both depend on our having coal. Coal is not found everywhere in Great Britain. In those districts where coal is found great industries have sprung up; where no coal is found the country is purely agricultural. Thus in Lancashire we have **coal** and the **cotton trade**; in South Wales we have **coal** and the **iron trade**; in Yorkshire we have **coal** and the **woollen trade**; but in Kent, and Essex, and Sussex, where there is no coal, we do not find great centres of manufacture; in these counties the people chiefly live by farming.

EARTH. § XV.

40. Coal gas and flame.

Let us now try a few experiments with coal gas, and see what we can learn about **Flame**.

EXPERIMENT 35.—Why does the flame of hydrogen

(see Experiment 18) give off so little light, whilst the flame of coal gas gives off so much? A simple experiment with the **Bunsen gas-burner** will soon explain this. If you stop up the holes at the bottom of the lamp with your fingers, you will see that the gas burns with a **luminous** flame; if you remove your fingers, the flame loses its brightness and burns blue. This is because **carbon** or soot in a finely divided state is present in the bright flame, but not present in the blue flame. Hold a piece of white paper for a few seconds over the bright flame, it will be smoked; but when held over the blue flame there will be no smoke. In

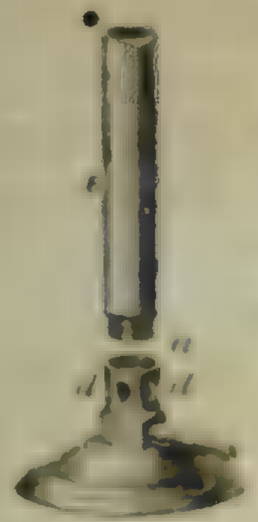

Fig. 28.

the bright flame the combustion (or burning) is incomplete, and solid particles of carbon are separated out in the flame and cause the flame to be bright; in the blue flame all the carbon is at once burnt by the air which rushes through the round holes and mixes with the coal gas before the mixture burns at the top of the lamp.

Experiment 36.—The different parts of a common candle flame are well worth study and teach us much. If you carefully look at the flame of a candle burning steadily you will see that the flame consists of three parts:—

1. A blue, scarcely visible outer zone, or mantle, where the combustion is complete.

2. An inner bright or luminous zone, where soot

is separated out and the light is given off, and where the combustion is incomplete.

3. A black cone in the inside, consisting of the unburnt gas given off by the wick.

The candle is in fact a small gas-works; the wax or tallow is the material which is distilled, the wick is the retort where the distillation goes on, and higher up and outside of this the gas burns.

You can show that this black cone consists of unburnt gas by taking a small bent piece of glass tube and putting the end into the black centre of the flame; the unburnt gases will pass up the tube and may be lighted at the other end (see fig. 29).

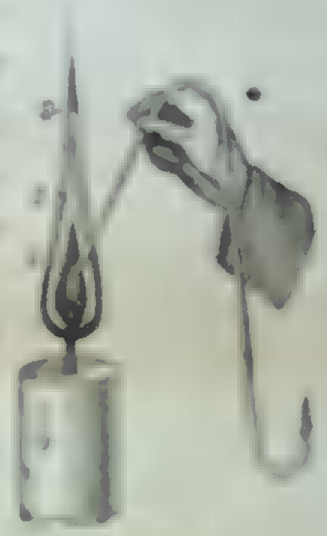

Fig. 29.

41. **Explosions in coal pits—how caused and how prevented.**

You have all heard of the dreadful accidents which sometimes happen in coal pits from explosions of fire-damp, or a kind of coal gas, which when it is mixed with air, explodes or burns suddenly and kills the miners. As the pits are dark the miners are obliged to take lights with them to see to do their work and get the coal, and when the gas or fire-damp rushes out from the coal it mixes with the air, and the mixture takes fire at the miners' candles, and it explodes and does great damage. These horrible

explosions can be prevented by using Davy's Safety-Lamp. Let us try if we can learn why this is.

Experiment 37.—Take a piece of common iron wire gauze, and bring it close over a gas-burner or the Bunsen's lamp; then turn on the gas, and light it on the top of the gauze; next remove the gauze several inches above the burner; the flame does not

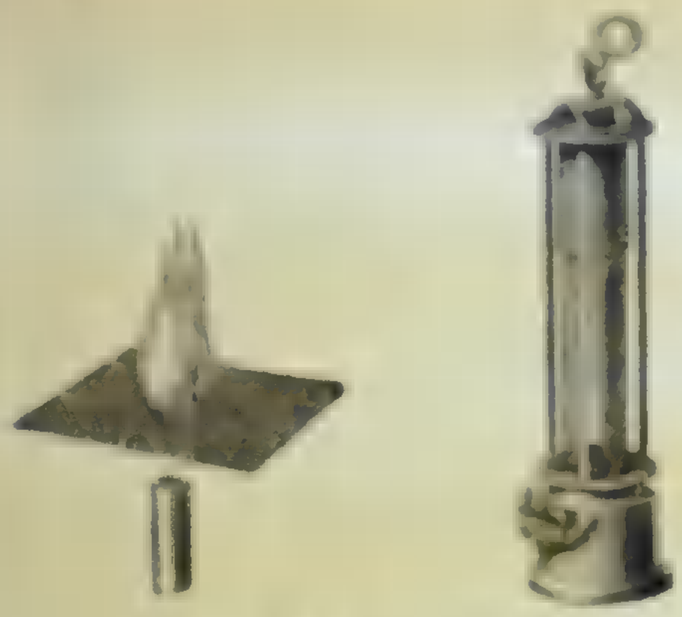

Fig. 30

pass through the wire gauze (fig. 30). Why is this? Because the metallic gauze so quickly takes away the heat that the gas will no longer burn.

Suppose now we were to place such wire gauze quite round a flame; we should see the flame burning inside the gauze; it would give light, and it would get air to burn through the meshes of the gauze; but no flame can pass through the gauze, and therefore if we take such a safety-lamp, like the

one drawn in fig. 30, into a mine where there is fire-damp, the gas in the mine cannot become lighted, because the flame cannot pass through the wire gauze. This is the reason why Davy's safety-lamp has saved so many lives.

In fig. 30 you have a picture of the lamp; you see the flame burning inside the wire-gauze ——, which is screwed tight on to the brass oil-can at the bottom. You learn how such a simple scientific principle as the one I have just explained may be made the means of saving thousands of lives, and render it safe to get the coal which we need so much.

ELEMENTS AND COMPOUNDS. § XVI.

42. The preceding experiments have taught us much respecting some of the common kinds of earthy substances which we meet with. These are, however, only a very small portion of the experiments which chemists have made, and by which they have learnt all that they know about the composition of the earth. It is only by examining and experimenting that we can learn anything in chemistry, and it is the business of the chemist to try and test the properties of every kind of substance which comes within his reach, to see what it is made of, and what kind of substances it contains.

In this way testing all bodies, whether they come out of the air or out of the sea or out of the inside of

the earth, or whether they are of mineral or of vegetable or of animal origin, chemists have found that all substances they meet with may be divided into two great classes:—

1. Simple bodies, or Elements—substances out of which nothing different can be got.

2. Compound bodies—substances out of which two or more different things can be got.

43. Let us look for some examples of simple and compound bodies; first among the gases. Oxygen gas is a simple body, or an element; nothing else can be got from oxygen. Hydrogen gas is also an element for the same reason. But coal gas is not an element, it is a compound, for we can split it up into, or get out of it, two quite different substances, viz. carbon or soot, and hydrogen gas. Carbonic acid gas, too, we have learnt is a compound of carbon and oxygen gas. So for liquids; the metal mercury is an element; we cannot get out of it anything different but the bright, shining, liquid metal: water, however, is a compound, for, as we have seen, we can in many ways prove that water contains the two elements oxygen and hydrogen. In like manner, many solids are elements or simple bodies, whilst many are compounds: thus, red oxide of mercury is a compound, for we can get from it metallic mercury and oxygen gas; chalk is a compound, for we can get from it carbonic acid and lime; common salt is a compound, for we can get the yellow gas chlorine from it, and likewise a metal; so is "bluestone," because

we can get bright red copper and also sulphuric acid from it. But sulphur, carbon, phosphorus, copper, iron, silver, gold, and many others, are all solid elements or simple bodies, for out of these we have not been able to get anything different. Nor have chemists ever been able to change any one of these elements into any other one.

44. By continually making experiments on the substances they see around them, chemists have found that everything which they have examined coming from either above, or on, or below the earth's surface, is made up of one or more of sixty-seven elementary bodies. Some of these are met with as gases, such as oxygen; some as liquids, like mercury; most, however, occur as solids, like sulphur and iron. Many of these elements are very common, and are found in enormous quantities, both as elements, or in the free state, and also combined; thus, for instance, oxygen is contained in the free state as a gas in the air, but combined with hydrogen to form water, and with the other elements to form oxides. Many of the elements are however found very seldom, and only in very few places, and these are generally not used in the arts or manufactures. Still we have no right to consider these elements unimportant and useless, although we cannot in these lessons do more than speak of those which are found in larger quantity.

For the sake of simplicity we divide the elements themselves into two classes, those which are metals,

such as iron, copper, gold, silver; and those which are non-metals, such as oxygen, sulphur, carbon. The difference in appearance between things which are metals and things which are not metals will be seen at once by looking at specimens of the above elements.

There are only fifteen non-metals, whilst we know altogether of fifty-two metals.

Here is a table containing the names of the most important elements:—

Non-Metallic Elements.	*Metallic Elements.*
Oxygen.	Iron.
Hydrogen.	Aluminium.
Nitrogen.	Calcium.
Carbon.	Magnesium.
Chlorine.	Sodium.
Sulphur.	Potassium.
Phosphorus.	Copper.
Silicon.	Zinc.
	Tin.
	Lead.
	Mercury.
	Silver.
	Gold.

These sixty-seven elements all possess different properties, by means of which they can be recognised and separated one from the other. Some, however, resemble one another more than others; thus, tin and lead are more like each other in their properties

than are oxygen and hydrogen. Now when we examine the way in which these elements unite together to form compounds, we find that the most unlike elements combine together. Thus, tin and lead do not form any compound differing in essential properties from either of the two metals; but oxygen and hydrogen, being unlike, unite to form water, a body quite different from either of the component elements. It is true throughout that chemical combination takes place most readily between those bodies which least resemble one another.

NON-METALLIC ELEMENTS. § XVII.

45. Now let us learn about the properties of these commoner elements in the order in which they are written in the table.

Oxygen is a colourless, invisible, tasteless gas. It exists in the free state in the air, mixed with about four times its bulk of nitrogen gas. It combines with all the elements (with one exception) to form oxides. When oxygen combines with other elements heat is evolved, and often light, and the substance is said to burn. Oxygen is contained in all rocks, sand, soil, and minerals. More than half the weight of our whole earth consists of oxygen. Oxygen is necessary for the life of animals; they breathe it, and use it to oxidize and purify the blood and to keep up the animal heat.

We can get pure oxygen gas by heating many compounds which contain it: thus by heating red oxide of mercury in a tube, or by heating chlorate of potash in a flask, we can test for oxygen by plunging a red-hot splinter of wood into the gas: if oxygen is present, the splinter will burst into flame.

To make oxygen gas on rather a larger scale than is described in Experiment 30, we may take half an ounce of powdered chlorate of potash, and mix it with enough black oxide of manganese to make it black. Then place the powder in a flask furnished with a perforated cork and long bent tube, placing the flask on a ring of the retort-stand so that you can gently heat the mixture, and then collect the gas, as it comes over, in bottles placed in the pneumatic trough, as shown in fig. 22.

You may show—

1. That a taper stuck on a wire having a red-hot wick will be rekindled when plunged into the bottle of oxygen, and then prove that carbonic acid is formed by pouring in lime-water.
2. That a piece of red-hot charcoal burns brightly in oxygen, likewise forming carbonic acid.
3. That a small bit of sulphur melted and allowed to burn on the spoon burns with a brilliant blue flame when plunged into oxygen.

4. That a very small bit of dry phosphorus put on the spoon and lighted burns with dazzling splendour in oxygen gas.

You may also show that the colourless gas formed by burning the sulphur, and the white fumes formed by burning the phosphorus, are both acid substances, because if you pour a little blue litmus solution into each of the bottles used, you will see that the blue solution will turn red.

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46. Hydrogen is also a colourless, invisible, tasteless gas. It does not occur in the free state in the air, but exists combined with oxygen to form water. By several ways we can get the hydrogen from water (Experiments 12 and 14), and also show that when hydrogen burns in the air pure water is formed. Hydrogen combines with many other elements—with carbon it forms marsh-gas (or fire-damp), a substance found in coal gas: hydrogen also is found in all acids; thus, in nitric acid, sulphuric acid, hydrochloric acid. Hydrogen gas is the lightest substance we know of, being 14½ times lighter than air, and it has therefore been used for filling balloons.

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47. Nitrogen is likewise a colourless, invisible, tasteless gas. It exists in the free state in the air. We can separate the oxygen in the air from the nitrogen by burning a piece of phosphorus (Experiment 6). Nitrogen also is found in many compounds,

in nitric acid, and nitre or saltpetre, and in ammonia or spirits of hartshorn. It is also found combined in the flesh of animals. Nitrogen does not unite readily with bodies, and is a very inert substance; it does not burn itself, nor support combustion nor animal life. It is, however, not poisonous, and animals die when placed in nitrogen simply from want of oxygen, that is, they are suffocated.

Nitrogen can be made to combine with hydrogen to form ammonia, and with hydrogen and oxygen to form nitric acid.

Experiment 38.—Nitric acid can be easily obtained by putting half an ounce of powdered nitre

Fig. 10

into a retort and pouring on it half an ounce of sulphuric acid. Then put a lamp under the retort, and a flask, kept cool in a basin of water, to catch the acid which comes over. Soon a yellow liquid will collect in the flask. This is nitric acid. It is very sour and corrosive; strong nitric acid will make

yellow stains and wounds if it touches the skin. It will turn blue litmus solution red, because it is an acid; and if mixed with an alkali, like caustic potash (which has the power of turning red litmus blue) it loses its acid properties. Take a little caustic potash solution and add litmus to it, then gently pour some nitric acid in; the blue litmus will soon turn red, because the acid neutralizes the alkali. If the water be now boiled away in a small porcelain basin, a white salt will be left which is nitre or saltpetre, made by the chemical combination of nitric acid and potash, the substance which we originally used to make the nitric acid; and if, after heating it strongly you dissolve a little of this salt in water, the solution will neither turn red litmus blue, nor blue litmus red: this shows that the salt is neutral.

Acids, Alkalis, and Salts.

From this experiment you learn—

1. That a substance is called an acid when it is sour and corrosive, and when it turns blue litmus solution red.
2. That an alkali is a substance which turns red litmus solution blue, and has the power of neutralising acids.
3. That a salt is the substance formed when an acid combines with an alkali and forms a neutral body.

Here again we see that unlike substances combine chemically with each other. No two bodies can be more unlike one another than nitric acid and potash, and these two unite to produce the well-known saltpetre, totally differing in its properties from either of the two things of which it is made up.

48. **Carbon.**—This is a solid element; we know it in the free state as charcoal, coke, or coal. Carbon also exists free as two other quite different sorts of bodies, viz.: the colourless hard gem called **diamond**, and the soft body, used for making pencils, called **blacklead** or **graphite**. How can we show that three such different substances as these are chemically the same element? Suppose we were to burn a bit of charcoal in oxygen gas, we get carbonic acid gas formed; if we burn a bit of graphite, we also get carbonic acid gas formed; and if, instead, we take a bit of diamond and burn it, we also find that carbonic acid gas is formed. From this we conclude that each of these three things—charcoal, graphite, and diamond—contains carbon. But do they contain anything else besides carbon? No, because if we take the same weight of each—12 grains of charcoal, 12 grains of graphite, and 12 grains of diamond—and burn them separately, we find that we get exactly the same weight of carbonic acid, viz. 44 grains, in each case. So that, although they look to be such very different substances—the precious gem and common coal—yet they are identically the same chemical element, carbon.

Carbon forms a necessary part of all vegetables and animals. In a piece of wood charcoal you can see the form and texture of the original wood; if a piece of flesh is charred, you soon see the black carbon; if, however, the wood or the flesh is completely burnt, then the carbon all disappears as carbonic acid gas, and only a small quantity of a white ash is left.

Experiment 39.—To show that vegetable matter contains carbon, take a few lumps of white sugar in a glass, and pour on these a little hot water to form a thick syrup. Then pour into the syrup some strong sulphuric acid. You will soon see that the syrup gets dark coloured, and then froths up, and all the white sugar is converted into black charcoal. This is because the sugar contains carbon, which has thus been made visible.

What would be the result if this single element, carbon, had not existed on the earth? Why, then no animal or vegetable being could have existed. So great a change can the absence of a single element produce.

Carbon, however, exists combined not only in the bodies of plants and animals, but also in the air as carbonic acid gas; and from what has been learnt (from Experiment 9), you will understand that this carbonic acid in the air serves as food for all plants. Carbon also exists in many rocks—as carbonic acid in chalk rocks, limestone rocks, and marble

NON-METALLIC ELEMENTS. § XVIII.

49. Chlorine is an element very different in its properties from any of those we have mentioned. It is a yellowish gas, possessing a very strong smell, and if breathed acts as a poison. Chlorine is not found in the free state in nature, but we can get it from a useful compound which contains it—viz. common salt. This body, which we use to flavour our food, and which gives the saltness to sea water, is made up of chlorine and the metal sodium, and common salt is therefore called chloride of sodium, or sodium chloride.

EXPERIMENT 40.—We can get chlorine from common salt by mixing a little salt with a little powdered black manganese oxide, putting the mixture

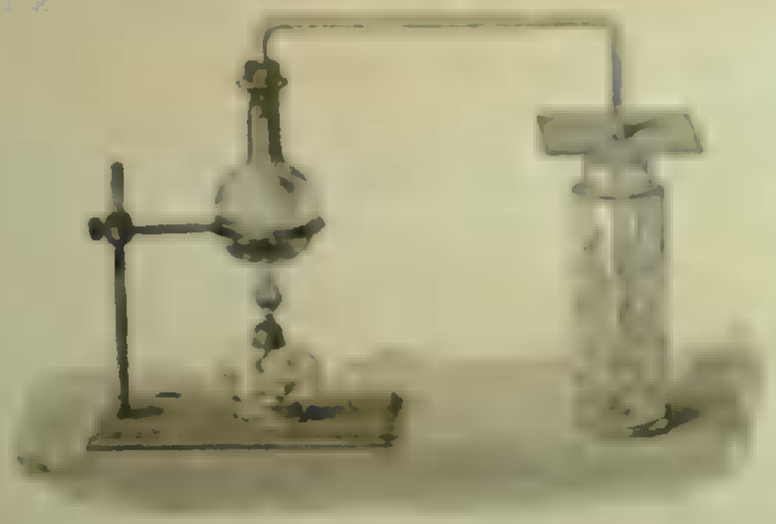

FIG. 32.

into a flask, and pouring onto the mixture some sulphuric acid diluted with the same quantity of water

By adapting a bent tube as shown in fig. 32, and by slightly heating the flask, a heavy yellow very strongly smelling gas is given off, and may be collected in the dry bottle.

This is the chlorine which was combined with the metal sodium in the rock salt: care must be taken not to breathe it, as it causes coughing and inflammation of the throat. This gas combines at once with metals to form chlorides; if we throw a little powdered metallic antimony into the bottle containing the chlorine gas, we see sparks of fire, and a white cloud of antimony chloride is formed. Thus we learn that substances can burn not only in oxygen, but also in chlorine gas, and that heat is given out whenever chemical combination occurs.

Chlorine also has a strong bleaching power, and it is largely used for taking the colour out of cotton and linen cloth. This you can easily prove by throwing in a bit of wet coloured cotton rag into a bottle of the yellow gas—after a few minutes' shaking the rag will have lost its colour.

Bleaching powder, which is sold in the shops for this purpose, contains chlorine, as you may see by taking a little of this white powder at the bottom of a bottle, and pouring onto it a little dilute sulphuric acid, when yellow chlorine gas will at once be seen above the white powder, and this gas will be found to bleach.

EXPERIMENT 41.—If we mix a little bleaching powder with water, and put a piece of coloured

cotton rag into it, the colour will not be discharged; but if we then dip the rag into water containing (or rendered sour with) a little sulphuric acid, the dye will begin to disappear; and if we repeat this once or twice, the rag will become white. This is the plan used by bleachers. The acid in the "souring" sets free the chlorine from the bleaching liquor, and this takes away the colour by destroying it.

50. **Sulphur**, or brimstone, is a yellow solid element; we know it in fine yellow powder, flour of sulphur, and in sticks or rolls. If we heat a little bit of sulphur in a spoon over a flame, it first melts, then boils, and then takes fire and burns away entirely, giving off a pale blue flame having the well-known smell of burning sulphur.

In this burning it is uniting with the oxygen of the air to form an oxide of sulphur, which is a colourless gas. Sulphur is used for putting on the ends of lucifer matches, because it easily takes fire and lights the wood. It is also used for making gunpowder, which is a mixture of sulphur, charcoal, and nitre.

Free sulphur is found in the earth in volcanic districts, and comes chiefly from the island of Sicily. Sulphur is found also in combination chiefly with metals, forming **sulphides** of the metals. These sulphides are generally the **ores** of the metals, that is, the substances from which the metals are obtained. Thus the ore of lead, a mineral called **galena**, is

sulphide of lead. Sulphur also combines with oxygen and hydrogen to form **sulphuric acid**, a very important chemical compound. This acid is a heavy oily liquid, and is commonly called oil of vitriol, and is made in enormous quantities (many thousand tons every week), and used for a great number of processes—for making alkali, for soap making, and dyeing, and calico printing and bleaching, and for the preparation of almost every other acid. Sulphuric acid unites with metals to form **sulphates**—thus we have **sodium sulphate**, or Glauber salts; **iron sulphate**, or green vitriol; **copper sulphate**, or blue vitriol; and many others.

51. **Phosphorus** is an element which does not occur in the free state in nature, but is contained in the bones of animals in combination with oxygen, and the metal calcium forming **calcium phosphate**. When a bone is burnt, a white porous mass is left called bone-ash, and from this phosphorus can be prepared.

Phosphorus, like carbon, exists in two different forms: one is known as yellow or common phosphorus; the other as red phosphorus. These two sorts of phosphorus differ very much in their properties.

EXPERIMENT 42.—Take a small iron tray, placed on a tripod, and carefully cut off a bit of yellow phosphorus as large as a quarter of a pea; this must be done under water, as the phosphorus is a very inflammable and dangerous substance, because it takes fire

of itself in the air, and produces serious burns if it takes fire whilst in the fingers. Then quickly dry the bit of phosphorus on a cloth or blotting-paper, and put the dried bit with a pair of tongs or a knife-blade onto the iron tray. Next take a bit of red phosphorus (or the powder) of the same size, and put it also on the iron tray. You will see that the red phosphorus is not kept, like the yellow, under water. The reason of this you will soon understand. Now put the flame of a lamp under the tray;—in a few instants the yellow phosphorus (*b*, fig. 33) will take fire and burn with a bright flame, and give off dense white fumes. The bit of red phosphorus (*a*), however, does not take fire, and we have to continue the heat for some time before this red substance catches fire: this it does however, at length, and then burns exactly like the yellow phosphorus. Thus we see that yellow phosphorus is very inflammable, and must be kept under water to prevent it taking fire with the oxygen of the air, whilst the red variety does not burn at all easily, and can therefore be kept in the air.

Fig. 33.

Experiment 43.—Yellow phosphorus takes fire by rubbing it. Take another very small bit, and wrap it in a piece of blotting paper; then rub it with your boot on the floor, or with a hammer on a piece of wood. You will see that the rubbing causes the

phosphorus to take fire and burn. This is the reason that common lucifer matches light when they are rubbed. The brown or red tip of the match contains phosphorus; when you rub or strike the match on any rough surface, the varnish which covers the phosphorus paste is scratched off, and the phosphorus takes fire and the match burns.

Safety lucifer matches are now made, which light only on the box. How is this? A little thought and examination will soon teach us. Take one of these safety matches, and try to light it on the sandpaper outside a common match-box, it will not light; but rub it on the brown or reddish-brown paper on the outside of the safety match-box, and it takes fire at once. The explanation is easy: the tip of the safety match contains no phosphorus, but only some substance which will easily cause phosphorus to burn, and therefore it cannot light by rubbing on any rough surface; the paper on the box is covered with some powdered red (or non-inflammable) phosphorus; when you strike the safety match on this red paper, a little of the red phosphorus sticks to the end, and then takes fire with the mixture on the tip.

32. Silicon is an element which (like phosphorus) we do not meet with in the free state in nature, although it is contained in enormous quantities in combination with oxygen. Silicon oxide, or silica, is known as quartz or rock crystal, and it is found in almost all rocks. Sand, sandstone, and flint, are

also more or less pure silica. Silica forms, with metals, compounds called **silicates**. Clay is a silicate, so therefore are bricks, pottery, and china, which are made from clay. **Glass** is also a silicate; it is made by heating together in a hot fire or furnace a mixture of white sand (silica), lime, and soda, or of sand, oxide of lead, and potash.

The first mixture forms what we know as **plate-glass** or **window-glass**; the second produces **flint-glass**. Silicon itself is a black crystalline substance, and is got by taking away the oxygen from silica.

All the rocks and stones of which the solid earth is made contain either silicon or some metallic elements, or both combined with oxygen. So you see that the earth is made up of **burnt** or **oxidized substances**. Now let us learn a little about the chief metals which the earth contains.

METALS. § XIX.

53. **Iron.**—We may well begin an account of the more important **metals** with iron, because of all of them iron is the most useful to man. Without iron we should almost be savages; we could have no railroads or engines or machines; no gas-pipes or water-pipes, no steel tools or knives. There was once a time when men had no iron, because this most useful substance is not found as a metal, but as an **earthy ore**, from which the metal can only be got with difficulty. In those

old days men used tools made of **bronze** or **copper**, and in still earlier times they only used **stone** hatchets and knives. One most useful ore of iron is red iron oxide, called **hæmatite** iron ore. By heating this with charcoal the oxygen is got rid of, and the metal iron remains, and this can be hammered into **bar-iron**, from which we can make horseshoes or spades; and it can be flattened by rolling into flat plates for making ships or boilers. This is called **wrought-iron**, because it can be hammered and wrought, or made, when it is red-hot, into anything which is wanted. This is the kind of iron which we see the blacksmith uses to make nails, or horseshoes, or the tyres of wheels; and it is very useful, because when hot it can be **welded**, that is, two pieces of hot iron when hammered together stick firmly together so that they cannot be separated. But there is another kind of iron also very useful; this is called **cast-iron**, because it can be melted, and poured when melted into moulds, and castings then got. Cast-iron is used for making gas and water pipes, for lamp-posts and railings, and large wheels, and the heavy stands for machines, and a great number of other things. Cast-iron is made from **iron ore**, and **coal**, and **lime-stone**, by putting these into large high furnaces, called **blast furnaces**, because the air is blown in to burn the coal and melt the iron by a powerful **blast**.

Cast iron cannot be hammered when hot, like wrought-iron, into bars or rolled into plates; it is

brittle, or breaks, like glass, into pieces under the hammer. Cast-iron is not pure iron, but contains carbon, which it gets from the coal; we can burn the carbon away (by a process called puddling), and we thus can get wrought-iron from cast-iron. A third kind of iron is called **steel**; this is used for making razors, knives, and tools, because it is both hard and tough, and can be ground so as to have a sharp edge. Steel also contains a little carbon, and can be made either from wrought or from cast iron.

If we burn iron in the air (Experiment 31) or in oxygen, we get oxide of iron. The same thing is formed when any piece of bright iron is left exposed to air and wet; it becomes **rusty**, and at last will all change to **rust**. Iron-mould on linen is also oxide of iron, or rust.

Experiment 44.—If you pour a little dilute sulphuric acid on a few iron-filings in a test-tube, gas

Fig. 8.

will at first be slowly given off; if the test-tube be warmed, the gas will escape more quickly, and it may

be lighted at the mouth of the glass. This gas is hydrogen; the iron dissolves in the acid, forming a salt, called sulphate of iron or green vitriol, and the hydrogen of the sulphuric acid is given off. If you let the test-tube with water, and then filter the liquor through a paper filter, you will get a nearly colourless solution, and if this be **evaporated** or boiled down (fig. 35), crystals of green vitriol will be formed on cooling.

Fig. 35.

We can tell that iron is present if we add a little of this solution mixed with a few drops of nitric acid to a pint of water, by pouring in a few drops of the bottle labelled "Potassium Ferro-cyanide," or yellow prussiate of potash, when a dark blue colour (or Prussian blue) will be formed.

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34. **Aluminium.**—We take this metal next because it is the metal got from clay, and is, therefore, contained in large quantities in many rocks. No one would suppose that a bright, silver-white metal can be got out of common clay, and yet chemists can do so. It is a pity that it is not easy to get rid of the oxygen

in the clay, for then we might use the bright metal aluminium for very many purposes. It costs too much to make the metal, although clay is so cheap and common. When this bright metal is strongly heated in the air, it burns and forms an oxide called alumina, the earth of clay.

The white crystals of alum contain this metal.

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55. **Calcium** too is a metal which is very difficult to get in the pure state, although its compounds are very common. Quicklime is calcium oxide; chalk and marble and limestone and coral are all calcium carbonate; gypsum is calcium sulphate; and bone earth is calcium phosphate. So you see that there is plenty of this metal in the earth.

Experiment 45.—In making carbonic acid from chalk and hydrochloric acid (Experiment 29), the liquid remaining in the bottle is a solution of calcium chloride. If you filter the liquid and boil down the clear solution to dryness, you will find a white dry powder left. This is a salt called calcium chloride. We used it in Experiment 20, for drying the hydrogen and collecting the water, as it takes up moisture with great ease. Let a little of the dry powder remain exposed to the air for a few hours; you will then find that it has become liquid, because it has absorbed, or taken up, the moisture which is always present in the air.

If you add some of the clear solution labelled

"Sodium Carbonate" to a little bit of the dry powder [illegible] calcium chloride, which you have dissolved in some water in a test-tube, you will see that the two clear liquids at once become milky or turbid. This is because calcium carbonate, or chalk, is produced, and chalk is insoluble, or does not dissolve in water like the calcium chloride does, and it is therefore thrown down, or precipitated. This represents what happens:

We take—

Calcium chloride (soluble in water)	and	Sodium carbonate (soluble in water);	

and we get, on mixing the solutions—

Calcium carbonate, or chalk (insoluble in water)	and	Sodium chloride, or common salt (soluble in water).	

This shows you that some salts of the same metal may be not soluble in water (like chalk), whilst others (like calcium chloride) readily dissolve in water. But you must take care not to fancy that any substance is a new one present which was not there before; we have here to do only with a difference of arrangement. An exchange takes place by which the chalk is formed, but the materials of the chalk were present in the original substances.

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56. **Magnesium** is a soft, silver-white metal, which can be made into wire and ribbon.

Experiment 46.—If you hold the end of a bit of magnesium ribbon about six or eight inches long in

the flame, the metal will take fire, and burn with a dazzling white light, and a white powder will fall on the ground. This white powder is **magnesia**, the oxide of the metal. Black as well as white fumes will be seen whilst the magnesium is burning. The black fume is not soot, for there is no carbon present; it consists of some of the metal, which is not burnt but is sent off as a cloud having a black colour: the white fume is the solid oxide magnesia going off in fine dust.

EXPERIMENT 47.—If you collect some of this white powder and warm it in a test-tube with a few drops of sulphuric acid, the white powder will dissolve; then pour the clear solution into a porcelain basin, and boil off the greater part of the water. On cooling, some long needle-shaped crystals will be found in the basin. These crystals are **magnesium sulphate**, or **Epsom salts**; a compound of magnesia and sulphuric acid.

There are many other compounds of magnesium, some of which are found in minerals and rocks. The metal is never found uncombined, and the process for making it from magnesia is rather a costly one; still it is now used for burning, and for making fireworks and signals, where a very bright light is needed. It keeps bright in dry air, and might be used for many purposes if it could be got cheaply.

METALS. § XX.

57. **Sodium** is the metal which we used (Experiment 13) for getting hydrogen from water. It is very unlike any metal which we see used in the arts; not only cannot we keep sodium in the air, because it at once oxidizes and forms a white powder, but we must not allow water to come near it, as it at once will combine with the oxygen of the water, and set free the hydrogen; but the metal must be kept under **rock-oil**, which contains no oxygen. We have seen (Experiment 13) that a bit of this curious metal, thrown upon water, swims on the surface, and hydrogen is given off; if the water has been turned red with a little red acid litmus, the colour will change to blue after the sodium has disappeared. This is because the **alkali soda** has been produced.

EXPERIMENT 48. Sodium is a very useful metal to the chemist, for he can by using it get the two preceding metals, magnesium and aluminium. Sodium, as you may be sure, does not occur in the free state in nature; it is made by taking away the oxygen from soda (the oxide of sodium). If you heat a small bit of sodium in a spoon over the flame of the lamp, it will first melt, and then take fire and burn with a bright yellow-coloured flame, white fumes of the oxide (soda) will be given off.

Sodium is the metal of the **soda salts**, a great many of which are very useful and common substances.

The following is a list of a few of the most important :—

Common Name.	*Chemical Name.*	*What it contains*
Sea, table, or rock-salt.	Sodium chloride.	
Glauber salts.	Sodium	Sodium and sulph
Washing-soda crystals.	Sodium	
Chili saltpetre.	Sodium nitrate.	

Of these **rock-salt** is found in largest quantity. It is got from mines, in Cheshire and elsewhere, and many hundreds of thousands of tons are used every year. It can also be got from **sea-water** by evaporation. From it all the other sodium salts can be got. Thus, if you want to get sodium sulphate or Glauber salts, you have only to pour **sulphuric acid** on common salt ; a dense fume of **hydrochloric acid gas** comes off, and sodium sulphate is left. What here happens is this :

We take

Sodium chloride (common salt) and sulphuric acid,

We get

Sodium sulphate (Glauber salts) and hydrochloric acid gas.

You may easily show that the fumes are strongly acid, by holding a little bit of wet blue litmus paper in the midst of the fume, when it will at once go red.

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58. Potassium is the metal contained in the alkali potash, and in the potash salts. A small bit of potassium, as large as half a pea, thrown onto water combines so violently with the oxygen, that the hydrogen at once catches fire and burns, the flame

being coloured violet by the **alkali potash** which is formed.

Potash salts are found in many places in the earth, and also in the ashes of plants; and this alkali derives its name because it can be got by boiling out wood **ashes** in **pots**. There are many useful potash salts : soda and potash are called the **alkalis**.

Common Name	*Chemical Name*	*What it contains*
Pot-ashes	Potassium carbonate	Potassium and carbonic acid.
Nitre or saltpetre.	nitrate	
Chlorate of potash		, & oxygen.

Experiment 19.—**Soap** is made by boiling animal or vegetable oils or fats with alkali. Soaps containing soda are **hard soaps** ; potash gives **soft soaps**. Common fat is boiled with alkali, and thus soap is got. You can easily make soap by pouring half an ounce of castor-oil into a thin porcelain basin with some hot water, and adding some caustic soda ; then on boiling the liquor the oil will all disappear, and soap will be formed which dissolves in the water. When it has boiled for a little, throw in a handful of common salt ; this will dissolve in the water, and will drive out the soap, which will swim on the surface. When cool, this soap will become a white, hard solid, and may be used for washing your hands. Common oils or fats are generally used ; we have taken castor-oil, because it is made into soap more easily than ordinary fats.

We next have to speak of several metals which are useful substances, some more valuable than others, but all used for a variety of purposes.

METALS. § XXI.

59. **Copper** is a reddish-coloured metal, used for making kettles, and pans, and boilers; copper wire is very useful, because it is both soft and tough. Metallic copper is sometimes met with in nature; it is then called **native copper**; it is, however, more commonly got from **copper ores**, of which there are several kinds. The most important ore of copper is the compound of copper and sulphur which we made in Experiment 5. By taking away the sulphur the pure metal copper can be got.

Copper is much used to mix with other metals, and yields useful alloys or mixtures of metal, such as **brass** and **bronze**. When copper is heated in the air, it **tarnishes**, and then becomes covered with a black coating of oxide; and if the heating be continued, all the copper combines with the oxygen of the air, and we get **copper scales** or black oxide of copper, which we used in Experiment 20.

Experiment 50.—If you take one or two copper turnings in a test-tube, and pour onto them a few drops of nitric acid, dense brownish-red fumes will be given off from the nitric acid, and a **blue solution of copper nitrate** will be formed. The copper has combined with nitric acid. One drop of this blue solution, poured into a test-tube full of water, will still give a blue colour when we add ammonia, and thus we can easily test for the salts

of copper. Bluestone (Experiment 32), or **copper sulphate**, is a compound of copper and sulphuric acid. You may try the ammonia test with a drop or two of a solution of this substance, and show that it gives the same deep-blue colour as the copper nitrate did.

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60. **Zinc** is a useful white metal. It is used for covering iron plate, which is then said to be **galvanized iron**. This covering of zinc prevents the iron from rusting in damp air. The chief ore of the metal is **zinc sulphide**, a compound of zinc and sulphur, called **Blende**. Zinc is also used to mix with other metals to form useful alloys; thus brass is an alloy of zinc and copper, and it is, therefore, not a simple or elementary body.

Experiment 51.—If we dissolve zinc in dilute sulphuric acid (Experiment 15), we get **hydrogen gas** given off and **zinc sulphate** left. Let us filter some of the liquid got in making hydrogen, and then evaporate it down. On allowing it to cool, white crystals of zinc sulphate will be formed. Zinc will burn when thin turnings are strongly heated in the air, and a white powder of zinc oxide is formed; in this respect zinc resembles magnesium.

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61. **Tin** is a bright white metal much used for "plating" iron. Common tin-plate is really iron-plate, which is covered with tin by dipping the iron into melted tin. The coating of tin preserves the iron

from rust. Tin is also used for making several useful alloys, such as pewter, Britannia metal, plumber's solder. The most important ore of tin is an oxide of tin, known as **Tin Stone**, and is found in Cornwall. Metallic tin is got from this by heating it with charcoal, which takes away the oxygen, and the pure metal melts and can be drawn off.

Fig. 26.

EXPERIMENT 52.—Take a little powdered oxide of tin, and mix with it about the same quantity of carbonate of soda, and then put this mixture in a hole made in a bit of charcoal. Now heat this with the flame of a blow-pipe, got by blowing into a luminous gas flame, made by stopping up the holes at the bottom of the Bunsen burner, as shown in the figure. Soon the mixture will melt, and after heating for some time you then cut that part of the charcoal out with

a knife, and rub the whole to fine powder in a mortar. Next wash away all the light particles of charcoal with water, and you will find some heavy bright round grains or globules of white metallic tin remaining at the bottom. In this experiment the oxygen of the tin oxide has united with the carbon of the charcoal to form carbonic oxide gas, which goes off, and the metal tin remains behind and melts with the heat.

---

62. **Lead** is a heavy metal with a bluish colour: it can be easily melted and cut, and does not rust or oxidize in the air; so that it is very useful for making pipes for gas and water, and for rolling into sheets for covering the roofs and gutters of houses. It is also used for making shot and bullets, because it can be easily melted and cast. Lead ore is found in Wales; it is called **Galena**, and is lead sulphide. The process for getting the metals from the ores is called **smelting**; and the branch of science which has to do with the getting of metals is called **metallurgy**.

There are several very useful compounds of lead.

Common Name.	*Chemical Name.*	*What it contains.*
White lead.	Lead carbonate.	Lead and carbonic acid.
Red lead.	Red lead oxide.	Lead and oxygen.
Litharge.	Yellow lead oxide.	Lead and oxygen.
Sugar of lead.	Lead acetate.	Lead and [illegible] acid.
[illegible] yellow	Lead [illegible]	Lead and [illegible] acid.

White-lead, red-lead, and chrome-yellow are used as paints. You must remember that black lead is the common name for graphite, and that it contains no lead whatever; it is pure carbon.

Experiment 53.—Add a little solution of potassium chromate to a glass filled with water, to which you have added some lead acetate solution. A splendid yellow precipitate of lead chromate, or chrome yellow, will be produced. This is what happens:—

Before Mixing | *After Mixing*

Potassium chromate and lead acetate (both soluble salts) } give { Chromate of lead (insoluble yellow powder) still potassium acetate (solution)

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63. **Mercury** or **quicksilver** is the only simple metal liquid at the ordinary temperature, and it is very valuable for this reason, especially for making thermometers [instruments for measuring heat] and barometers [instruments for measuring the pressure of the air], about which you will learn in the Physics Primer, and for silvering mirrors. Mercury does not tarnish in the air, but it oxidizes when heated, forming **red oxide** of mercury, from which the oxygen can be driven off again by heating it more strongly (Experiment 30). Mercury can be boiled, and, like water, it may be distilled. Like many other metals, mercury and its compounds are very poisonous, but taken in small quantities some of them are used as medicines.

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64. **Silver** is a highly prized and valuable metal. It is found in Mexico, Peru, and elsewhere. The property which makes silver so useful is that it never

tarnishes from oxidation, but it goes black when brought near sulphur, as a black sulphide is formed. Silver has been used since the earliest times for making valuable and beautiful articles, and especially as an article of exchange as **silver coin**. English silver coin contains a little copper, added for the purpose of hardening the silver.

Experiment 54.—Let us see if we can find both copper and silver in a sixpence. Cut a piece of a sixpence, put it into a test-tube, and pour on it some nitric acid. Soon dense red fumes will come off from the nitric acid, and on warming gently the whole of the silver will be quickly dissolved. We have seen (Experiment 22) that silver can be used to detect the presence of sodium chloride, or common salt. Now add some solution of common salt to the solution of silver in nitric acid; a dense **white precipitate** of insoluble **silver chloride** will be thrown down. What happens is this:—

We have | We get

Now filter through paper. The clear solution has a bluish-green colour, and contains the whole of the copper. Put a bit of bright iron into the liquid, and a red deposit of metallic copper will soon be seen on the iron.

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65. **Gold** is a still more valuable metal than silver. It has a beautiful yellow colour, and is found always

as metallic gold. Lately much gold has been got from California and Australia. Gold is one of the heaviest metals we know of, and it can be drawn out into very thin wire and beaten out into very thin plates called **gold leaf**, which is much used for gilding. Pure gold is too soft to make coins of, so in England a little copper is added to the gold to make sovereigns, which has the effect of hardening the metal.

EXPERIMENT 55.—Gold does not dissolve in any one acid. Take a leaf of gold and divide it into two pieces; put one piece into one test-tube and one into another; pour upon one a little nitric acid, and onto the other a little hydrochloric acid. The gold in neither glass will dissolve: now pour the two together and the metal rapidly disappears, showing that although neither acid by itself can dissolve gold, a mixture of both can do so. Gold never tarnishes in the air or gets stained with sulphur, like silver, so that is has been much used for ornaments as well as for coin from the earliest times.

RESULTS. XXII.

66. **Combination in definite proportions.**—It will be useful to consider some of the most important results to which the study of fire, air, water, and earth has led us. You have now a distinct idea of some of the different kinds of matter of which the

world is made up. You have learnt that all the various things—whether solid, liquid, or gaseous; whether animal, vegetable, or mineral—are composed of one or more of sixty-seven elementary or simple substances. No one of these can be converted into any other one, nor has any one of these ever been split up into two different new things.

You have also learnt that these elements unite together to form compound bodies which differ altogether in properties from the original elements, but from which these original elements can again be obtained in various ways. You have learnt that the weight of the compound is always exactly the sum of the weights of the elements, and that in all the chemical changes which take place, no loss of weight ever occurs. We cannot either create or destroy matter.

The use of the balance for weighing bodies and for determining the composition of chemical substances has also been made clear to you. Chemists have to weigh everything they wish to examine, and thus to find out—as we did in the case of water in Experiment 20—what weight of each element is contained in the compound.

We found that—

Sixteen parts by weight of oxygen	16
and Two parts by weight of hydrogen	2
make up eighteen parts by weight of water	18

and I told you that water always contains its

elements in these fixed proportions. The same thing is true for all other chemical compounds—they all contain their elements in fixed proportions. Thus, for instance, chemists have found, by careful weighing, that the red oxide of mercury, which we used in Experiment 30, always contains

Oxygen . .	16 parts by weight.
and Mercury . .	200 " "
making Oxide of mercury	216

So if I want to get 16 lbs. of oxygen, I must take at least 216 lbs. of the red powder, and if I do not lose any by accident, I shall get exactly the quantity of oxygen I want. And you will understand that by a simple proportion I can calculate the weight of the red oxide which I must take to get any other weight of oxygen.

This great fact of the **constancy of chemical combination** runs through all the changes we have noticed. If we want to get all the nitric acid we can from the least weight of nitre and sulphuric acid (Experiment 38), we must take 98 parts of sulphuric acid and 101 parts of nitre, and we shall always get 63 parts of nitric acid. And if I burn 24 parts of magnesium wire (Experiment 46), I shall always get exactly 40 parts of magnesia, provided I lose none.

Thus you learn that all the elements combine with each other in fixed proportions by weight, and the numbers representing these proportions are called the

67. Combining weights of the elements.

Here is a list of some of the more important elements—

Non-Metallic Elements			*Metallic Elements*		
Oxygen	O	= 16	Iron	Fe	= 56
Hydrogen	H	= 1	Aluminum	Al	= 27
Nitrogen	N	= 14	Calcium	Ca	= 40
Carbon	C	= 12	Magnesium	Mg	= 24
Chlorine	Cl	= 35	Sodium	Na	= 23
Sulphur	S	= 32	Potassium	K	= 39
Phosphorus	P	= 31	Copper	Cu	= 63
Silicon	Si	= 28	Zinc	Zn	= 65
			Tin	Sn	= 118
			Lead	Pb	= 207
			Mercury	Hg	= 200
			Silver	Ag	= 108
			Gold	Au	= 197

with their combining weights and their symbols attached to them. The letter placed after the name of each element is the symbol or short way of writing the name; thus, instead of writing the word phosphorus, I may write the letter P. For these symbols, the first letters of the words are generally taken; but in some cases the Latin and not the English word is used; thus Fe stands for iron, from the Latin **ferrum**, Ag for silver, from the Latin **argentum**. The numbers placed after the symbol of each element represents the **fixed proportion**, by **weight**, in which that element combines with others. Each of these numbers has been found by experiment, that is,

by the analysis of the compounds which that one element forms with others. Thus we find, when we analyse the red oxide of mercury, that it contains 16 parts by weight of oxygen to 200 parts by weight of mercury, to form 216 parts by weight of the oxide; or when we heat sulphur and copper together (Experiment 5) until they combine, we find that exactly 63 parts by weight of copper unite with 32 parts by weight of sulphur to form 95 parts by weight of copper sulphide; and if more than this quantity of one of these elements had been taken, it remains uncombined. Now the same weight of oxygen (16 parts) unites with other metals to form oxides, and the weight of metal with which it unites is either the combining weight of the metal, or some weight bearing a close relation to the combining weight. Thus 16 parts by weight of oxygen unite with 56 parts by weight of iron to form an oxide of iron; with 40 parts of calcium to form an oxide of calcium, called common lime; with 65 of zinc, 118 of tin, 207 of lead, to form oxides of these metals.

Our chemical short-hand means, however, more than I have yet told you. If I write the symbol O, or the symbol Hg, I signify thereby not any weight of oxygen or of mercury, but exactly the combining weights of these two elements. O means 16 parts by weight of oxygen, and no other weight; Hg means 200 parts by weight of mercury, and no other weight; and therefore I have written O = 16 and Hg = 200 in the table.

Now supposing I want to write the chemical symbol for a compound, I have only to put the symbols of the elements it contains alongside of one another. Thus HgO signifies oxide of mercury; and this symbol not only tells me that the compound contains oxygen and mercury, but it tells me how much oxygen and how much mercury the body contains, because I remember that O means 16, and Hg means 200; so that the chemical symbol, or formula, is most useful as expressing not only the qualitative composition (or what the body contains), but also the quantitative composition (or how much of each thing the body contains). Thus, again, CaO means calcium oxide, or lime, and exactly 40 and 16, or 56 parts by weight of lime; ZnO means zinc oxide, but 65 and 16, or 81 parts by weight; whilst H_2O signifies water, being twice H, or two parts by weight of hydrogen combined with 16 parts by weight of oxygen to form 18 parts by weight of water.

68. Some of the elements combine together in different fixed proportions, forming several compounds. Thus nitrogen and oxygen unite to form five different compounds, as follows:—

The first compound, called nitrogen mon-oxide, contains 28 parts by weight of nitrogen, to 16 parts by weight of oxygen.

The second compound, called nitrogen di-oxide, contains 28 parts by weight of nitrogen, to twice 16, or 32 parts, by weight of oxygen.

The third compound, called nitrogen tri-oxide,

contains 28 parts by weight of nitrogen, to three times 16, or 48 parts, by weight of oxygen.

The fourth compound, called nitrogen tetroxide, contains 28 parts by weight of nitrogen, to four times 16, or 64 parts, by weight of oxygen.

The fifth and last compound, called nitrogen pentoxide, contains 28 parts by weight of nitrogen, to five times 16, or 80 parts, by weight of oxygen.

Now remembering that N means 14, and that O means 16, we can easily write the symbols for the above compounds.

The first compound contains 28 parts, or two combining weights of nitrogen, to 16 parts, or one combining weight of oxygen. Hence we write the symbol of this compound N_2O.[1]

For a like reason we write the formula

Of the second compound N_2O_2
" third " N_2O_3
" fourth " N_2O_4
" fifth " N_2O_5

From this we see that the weight of oxygen contained in the four last of these compounds is twice, three times, four times, and five times that contained in the first compound. And, moreover, we find that it is not possible for us to prepare a compound containing any intermediate quantity of oxygen. If, for instance, we try to combine 28 parts by weight of

[1] The small figure written below the symbol means that the weight is to be taken more than once. O_3 means Oxygen = 16 taken three times, or $3 \times 16 = 48$.

nitrogen, with 20 parts by weight of oxygen, we get the whole of this nitrogen combined with only 16 of the oxygen, the other 4 parts of oxygen remaining uncombined. Here, then, we have arrived at the two most important laws of chemical combination :—

1. The law of combination of the elements in fixed proportions, called the combining weights.
2. The law of combination in multiple proportions of these combining weights, when several compounds of the same two elements exist.

69. Meaning of a chemical equation.

You will now be able to understand that all the chemical changes which I have spoken of, and which you have seen, or ever will see, can be written down in symbols. Every one of these changes is definite, and in every case we can get to know not only what has taken place, but also how much of each substance has been formed. Let us take one or two examples. If I want to prepare nitric acid (Experiment 38), I take nitre (potassium nitrate) and sulphuric acid, then nitric acid distils over, leaving potassium sulphate in the retort. Now what happens in this change ; and how much sulphuric acid and how much nitre am I to take, so as not to waste either? In order to find this out, I must write down the formula for nitre, and for sulphuric acid. Nitre is written KNO_3 ;[1] that is, it

[1] The number below the letter applies to that letter only.

contains three elements—potassium, K = 39; nitrogen, N = 14; oxygen, O_3 = 3 times 16, or 48. Sulphuric acid is written H_2SO_4; that is, it contains hydrogen, H_2 = twice 1, or 2; sulphur, S = 32; oxygen, O_4 = 4 times 16, or 64. When we mix these two compounds together, a change occurs; half the hydrogen (H)$_2$ in the sulphuric acid changes place with the whole of the potassium (K) in the nitre, and two new substances are formed, viz. HNO_3, nitric acid (which distils off as a yellow liquid), and $KHSO_4$, sulphate of potassium, which remains in the retort as a white solid salt. This change we can therefore express in an equation, thus—

Before the change. *After the change.*

Nitre and Sulphuric Acid yield Nitric Acid and Potassium Sulphate

$$KNO_3 + H_2SO_4 = HNO_3 + KHSO_4$$

This shows us, then, exactly what takes place; nothing is lost; the nitric acid and potassium sulphate which we get, weigh, taken together, as much as the nitre and the sulphuric acid which we took. We see this clearly if we write down the numbers which these symbols represent.

$39 + 14 + 48$ and $2 + 32 + 64 = 1 + 14 + 48$ and $39 + 1 + 32 + 64$

101 + 98 = 63 + 136

The equation then tells us that if I take 101 parts by weight of nitre, and 98 parts by weight of sulphuric acid, I shall get exactly 63 parts by weight of nitric acid, and that no nitre or sulphuric acid will be wasted; and you will easily understand that these

numbers enable you to calculate the quantity of the materials you must take, to get any given weight of the acid. Suppose you wanted 10 pounds of nitric acid, how much sulphuric acid and nitre would you need to employ? Well, if you wanted to get 63 pounds of nitric acid, you would need 98 pounds of sulphuric acid, and 101 pounds of nitre; and, of course, in order to get 10 pounds you will need $\frac{10}{63}$ of 98 pounds of sulphuric acid, and $\frac{10}{63}$ of 101 pounds of nitre. So that all calculations of this kind are matters of simple proportion.

Let us take one other example. We made hydrogen by acting upon zinc with sulphuric acid and water (Experiment 15). The change which here takes place is represented by the equation—

$$Zn + H_2SO_4 = H_2 + ZnSO_4 \text{ or}$$

Zinc and Sulphuric Acid yield Hydrogen and Zinc Sulphate

65 and 2 + 32 + 64 yield 2 and 65 + 32 + 64 or

65 and 98 yield 2 and 161

parts of Zinc. parts of Sulphuric Acid. parts of Hydrogen. parts of Zinc Sulphate.

This means that if I take 65 pounds of zinc, and 98 pounds of sulphuric acid, I must always get 2 pounds of hydrogen gas, and 161 pounds of zinc sulphate. If I ask you how much zinc and sulphuric acid you must take in order to get 40 pounds of hydrogen, I am sure you will all be able to tell me.

In like manner every chemical change, as soon as we understand it, can be represented by a formula, or set of symbols, which tells us exactly what happens,

and how much of each of the various materials must be taken, and how much of each of the several products are formed.

It is the business of the chemist to seek out and determine the nature of all new chemicals which may be observed, and he does this with zeal and confidence, because he knows that if he has once determined, with care, the nature of the change, and if he has once ascertained the proportions by weight in which the elements, or compounds, take part in it, he has settled this particular question for ever, as the same chemical combination always takes place according to the same unchanging laws.

HINTS FOR THE USE OF THE APPARATUS AND FOR THE EXPERIMENTS.

1. Try every experiment over carefully before it is shown in class, and observe *exactly* the description given in the text.

2. Cleanliness and neatness in manipulation are as necessary in doing experiments as clearness of exposition is in teaching.

3. Place *everything* needed for the experiments of the day in order upon the table, so that there may be no confusion or delay.[1]

[1] Faraday, our great master in experimental lectures, always devoted many hours to the preparation of the experiments for each lecture. No point, however trifling, bearing upon the

4. When the lessons are over, carefully clean all the apparatus, and remove it and the specimens to a locked box or cupboard. Many of the acids, especially sulphuric and nitric, are dangerously corrosive, phosphorus is dangerous from its inflammable nature, whilst these and others of the reagents are poisonous, so that all must be completely removed from the pupils, and had better be kept in the teacher's private room.

5. The elder and more advanced pupils, having once seen the teacher go through the course of experiments, may with great advantage be permitted to perform the experiments for themselves under his superintendence.

Notes for the Experiments:—

Experiment 1.—If the neck of the bottle be very wide, the top must be covered by a piece of card, otherwise sufficient fresh air will get in to permit the continued combustion of the candle.

Experiment 3.—The tube containing the caustic soda should be carefully removed and corked up after each experiment, to prevent the caustic soda absorbing carbonic acid and moisture from the air. After the same caustic soda has been used for the experiment several times, the tube must be cleaned out, and a fresh supply of lumps of caustic soda obtained.

Experiment 5.—This may also be done in a test-tube; take care to have the copper turnings well heated before the sulphur boils, otherwise the glow is not well seen.

Experiment 6.—Take great care how you cut phosphorus; do so always under water. Then carefully and lightly dry the bit of phosphorus with blotting-paper, and

—— of the experiment was considered unimportant, he used to try the stoppers of all the bottles he had to use to see that they had not become fixed, and thus would cause delay by repairing possible sticking.

put it, with a dry knife or small pliers, onto the small floating dish.

Experiment 10.—This cannot be easily shown in winter, as the light is not intense enough.

Experiment 12.—How to charge the Grove's battery. Measure one pint of water into a basin, and gradually pour into this three fluid ounces of strong sulphuric acid or oil of vitriol, and let the liquid, after well mixing, be allowed to stand till it is cool. See that all the clamps and metal connections are bright, using sand-paper to clean them. Set up the battery with the porous cells and platinums inside the pot cells, and clamp all tight. Pour the dilute sulphuric acid into the pot cells so as nearly to fill each; then by means of a funnel carefully nearly fill each of the porous cells with strong nitric acid. The battery is now ready for action. When done with, the sulphuric acid may be returned to a bottle kept for the purpose, and the nitric acid poured into another bottle, unless the battery has been long in use, when both acids may be thrown away. The porous cells and zincs must be allowed to soak in water over-night and then placed back in their places. Should any of the zincs begin to effervesce in the acid when the wires of the battery are not in contact, they must be amalgamated afresh. This is done by washing the surface of the zinc with some hydrochloric acid, and then pouring some mercury, together with the acid, over the metal. After repeating this several times, the metal will possess a uniform bright colour, and will not dissolve in dilute sulphuric acid unless the wires be joined.

Experiment 16.—The union of sodium and mercury is always accompanied by a slight explosion, but quite free from danger. Always take five times by bulk as much mercury as sodium.

Experiment 17.—It is best to mix the sulphuric acid and water (one to six by volume) beforehand; pour the acid into the water in a thin stream, and stir the mixture round.

Experiment 20.—A piece of hard, wide glass tube without a bulb, fitted with a cork to the tube E, and drawn out at the other end, as shown in the figure, may serve instead of the bulb-tube A. Unless nearly half an ounce of copper oxide is taken the weight of water formed will be too small. After the experiment is finished, the reduced metallic copper may again be oxidized by heating it in an open porcelain dish over a Bunsen burner. The oxide thus formed will have gained its original weight, and can be used again for a repetition of the same experiment.

Experiment 31.—In order that this increase of weight by oxidation should be rendered evident, the magnet must be a good one, the filings very fine, and the balance delicate. Another mode of showing the increase of weight by absorption of oxygen is that mentioned above when the reduced copper is heated in a current of air.

Experiment 36.—It requires a little practice to get the gas to burn permanently at the end of the tube.

Experiment 40.—In a close room the evolution of chlorine gas should be avoided.

Experiment 52.—When using the blowpipe the breath must be sent out from the cheeks and not from the lungs; it is thus possible to inflate the cheeks when required by breathing through the nose.

LIST OF APPARATUS REQUIRED FOR EACH EXPERIMENT.

WITH APPROXIMATE PRICES OF THE ARTICLES

As quoted by Messrs. Philip Harris & Co., Ltd., Birmingham, Messrs. J. Woolley, Sons, & Co., Manchester, and Messrs. John J. Griffin & Sons, 22 Garrick Street, London.

No. of Expt.		Price. £	s.	d.
1.	—Taper with wire holder	0	0	2
3.	—Glass tube containing a taper, with wire to attach to the scales	0	1	6
	Pair of hand-scales with glass pans, and weights from 2 oz. downwards, in oak box	0	4	6
5.	—A 2-oz. glass flask 3d., iron tripod stand, 10d.	0	1	1
	Bunsen's burner, with one yard of caoutchouc tubing	0	1	8
	(This will be replaced by a spirit lamp and one pint of methylated spirit when desired.)			
6.	—A bell jar, 1s., capsule to contain the phosphorous, 5d.	0	1	5
12.	—Apparatus for decomposing water by electricity, with two collecting tubes and wire to suspend them	0	2	0
	A 4-cell Grove's battery, in wooden tray, with wires	1	16	0
14.	—Glass mortar and pestle, 10d., gas eprouvette, 6d.	0	1	4
15.	—Flask, &c. for generating hydrogen	0	1	8
	Stoneware pneumatic trough, with beehive shelf	0	2	8
	Four wide-mouthed gas-collecting bottles, pint size	0	1	4
	Three stoneware gas trays	0	0	8
20.	—A pint flask, wash-bottle, two U-shaped calcium chloride tubes, and hard glass tube to contain the copper oxide	0	4	0

No. of Expt.		Price. £	s.	d.
21.	—Two 8-oz. stoppered glass retorts	0	1	6
	A retort stand, with three rings, and clamp for test-tubes, &c.	0	3	6
23.	—A 16-oz. porcelain evaporating dish, 1s. 6d., 4 oz. ditto, 8d.	0	2	2
25.	—Two 3-in. glass funnels, 6d., 100 filter-papers, 7d.	0	1	3
31.	—A horseshoe magnet	0	0	4
32.	—A palette-knife	0	0	4
37.	—A piece of iron wire gauze, six inches square	0	0	3
42.	—Iron tray or sand bath	0	0	4
44.	—One dozen 5-in. test-tubes, 1s., test-tube holder, 6d.	0	1	6
	Test-tube stand for twelve tubes	0	1	3
	One blowpipe, 1s., two files (round and triangular), 1s. 6d.	0	2	6
	Half a pound of glass tubing, 6d., two dozen assay corks, 3d.	0	1	0
	Amounting to	£3	18	5

CHEMICALS, &c.

Sulphuric acid	4 lbs.	Silver nitrate (crystals)	1	oz.
Nitric acid	3 ,,	Litmus	1	,,
Hydrochloric acid	2 ,,	Indigo	1	,,
Lime-water	1 pint.	Calcium chloride	8	,,
Ammonia (solution)	4 oz.	Marble	4	,,
Caustic potash	4 ,,	Iron filings	8	,,
Sodium carbonate	4 ,,	Lime	4	,,
Potassium chromate	4 ,,	Gypsum	4	,,
Potassium ferrocyanide	4 ,,	Sand (fine)	4	,,
		Bleaching powder	4	,,
		Manganese dioxide	1	lb.
		Soda crystals	4	oz.

Alum	4 oz.	Sodium carbonate, anhydrous	1 oz.
Sulphur roll	4 ,,	Phosphorus, yellow	1 ,,
,, flour	4 ,,	,, red	½ ,,
Potassium nitrate	4 ,,	Tin oxide	½ ,,
Zinc	2 ,,	Mercury oxide	½ ,,
Copper turnings	2 ,,	Potassium	1 piece
,, oxide	2 ,,	Sodium	1 ,,
,, sulphate	2 ,,	Gold leaf	6 leaves
Antimony	2 ,,	Magnesium ribbon	½ yard
Mercury	2 ,,	Litmus paper	1 book
Lead acetate	2 ,,	Charcoal	1 piece
Castor oil	2 ,,		
Caustic soda (solid)	2 ,,		

Packed in Bottles

Amounting to £3 3 0

LIST OF SPECIMENS.

Aluminium.	Tin ore.
Tin.	Galena.
Lead.	Zinc blende.
Silver.	White sand.
Bar iron.	Red ,,
Cast iron.	Flint.
Steel.	Quartz.
Galvanized iron.	Graphite.
Iron ore.	Rock salt.
Iron oxide.	Sodium sulphate.
Iron sulphate.	Sodium nitrate.
Bronze.	Bone ash.
Brass.	

Limestone.	Potassium chlorate.
Magnesium sulphate.	White lead, Red lead.
Potassium carbonate.	Litharge.

Amounting to £0 7 6

Messrs. Philip Harris & Co., Limited, Birmingham, Messrs. J. Woolley, Sons, & Co., Manchester, and Messrs. John J. Griffin & Sons, 22 Garrick Street, London, will supply the above enumerated apparatus, chemicals, preparations, and specimens, packed in a box with lock and key, for the sum of £5 10s.

QUESTIONS.

§ I. Fire.

1. What happens when a taper is burnt in a clean glass bottle with a narrow neck?

2. How can you show that the air in the bottle after the taper has burnt in it is not the same as it was before the taper was burnt?

3. What is the milkiness of the lime-water caused by?

4. How can colourless carbonic acid gas be distinguished from colourless air?

5. Where does the carbonic acid gas which is formed when the taper burns come from?

6. How can you show that carbon, or soot, or charcoal, can be got from the wax of the candle?

7. Describe an experiment to show that water can be obtained by burning a candle.

8. Write out four things you have learnt about a candle burning.

9. Why do you conclude that the wax of the candle has not been lost or destroyed, but has only changed its form?

10. Could anybody have foretold that the wax would change into two totally different substances when the candle burns?

11. How do people learn about these things?

12. Why is chemistry called an experimental science?

§ II. Fire.

1. What becomes of all the coal which you may keep on the fire all day long?

2. Describe an experiment to prove that the carbonic acid gas

and the water coming off from a burning candle weigh more than the candle before it is burnt.

3. How can this be explained?

4. Give some examples of chemical union.

5. What is oxygen gas, and where is it found?

6. What general truth respecting the [illegible] creation of substances has been found out by further experiment?

7. Explain how you would show that when chemical union takes place heat is given off.

8. Why does quicklime become hot when water is poured upon it?

9. What happens when bright copper turnings and yellow sulphur are heated together in a flask?

10. What is the black substance found in the flask after the experiment?

11. What is going on when a bright fire is burning?

§ III. Air.

1. What is wind?

2. How can you show by experiment that there are two kinds of invisible gases contained in the air?

3. What names have been given to these?

4. In what properties do these gases differ from one another?

§ IV. Air.

1. Which of the component gases of the atmosphere is used by animals when they breathe?

2. Do men or animals produce any chemical changes in the air which they breathe?

3. Explain a simple experiment to show that this is the case.

4. What happens to the oxygen of the air when it is taken up by the blood in the lungs?

5. How can you show that a piece of animal flesh contains carbon?

6. Why is the animal body warmer than surrounding bodies usually?

§ V. Air.

1. How can you prove that carbon is contained in vegetable matter?

2. What do growing plants obtain the carbon which they need for their growth?

3. What happens when some clear lime-water is poured into a shallow glass, and allowed to stand for a few minutes exposed to the air?

4. What purpose does the carbonic acid gas serve which is contained in the air?

5. Describe an experiment to show that plants have the power in presence of sunlight of decomposing the carbonic acid of the air, setting free the oxygen as a gas.

6. What is the difference as regards breathing between plants and animals?

§ VI. Water.

1. Name the three different states or conditions in which water is known to us.

2. If we send heat into ice it melts into water, and if the heat continues longer it causes the water to boil. What happens when we send a stream of electricity through the water?

3. Draw a sketch of the apparatus used for decomposing water.

4. How can you tell which of the two gases is oxygen and which hydrogen?

5. Can hydrogen be got from water by other means?

6. What happens when the metal potassium is thrown into water?

7. How can the hydrogen thus evolved be collected, and how would you ascertain that the gas is hydrogen, and not oxygen?

§ VII. Water.

1. How can hydrogen be obtained by the action of zinc, sulphuric acid, and water?

2. What would you do with two jars filled with hydrogen, in order to show that this gas burns, and is lighter than air?

3. What is formed when hydrogen burns, and how can you experimentally prove your assertion?

4. How would you prove that no carbonic acid gas is formed when hydrogen burns in the air?

5. Draw a sketch of the apparatus used in making hydrogen, and collecting the gas in bottles.

6. Does water contain anything besides oxygen and hydrogen?

§ VIII. Water.

1. Draw a sketch of a pair of scales or a balance.

2. What happens when hydrogen gas is passed over heated oxide of copper?

3. Describe the arrangement of an apparatus used for determining the composition of water by weight.

4. How can you show by experiment that water contains 16 parts by weight of oxygen to 2 parts by weight of hydrogen?

5. If you have once accurately ascertained the chemical composition of water, is it necessary to do so again at any other time? If not, why not?

§ IX. Water.

1. What is the difference between fresh spring water and sea water?

2. How can you get the salt out of sea water?

3. What plan would you adopt for getting fresh or drinkable water from sea water?

4. Describe a more delicate test for salt in water than your sense of taste.

5. What is meant by "solution" and "crystallization"?

6. What happens when alum and sulphate of copper crystals are dissolved in water and the solution evaporated?

7. How would you tell which crystals are alum and which sulphate of copper?

§ X. Water.

1. How does the rain get up into the clouds?

2. Why does the moisture when once it is up in the sky stay there?

3. What reasons have we for saying that rain is distilled water?

4. Where does every drop of running water on the globe come from originally?

5. How can you separate sand or dirt from water?

6. What is the difference between suspended and dissolved matter?

7. If sugar or salt is shaken up with water, what happens? Can the salt or the sugar be again separated by filtration?

8. How can you tell whether a water is "soft" or "hard"?

9. How can soft water be made hard by adding?

§ XI. Water.

1. If you blow the air from your lungs for a long time through clear lime-water, what happens?

2. Why does the milky lime-water in the above experiment again become clear?

3. How can you show that this clear water contains chalk in solution?

4. By what means can chalk-water be softened on a large scale?

5. Thames water and Trent water are both hard. In what respects do they differ, and how do you explain this difference?

6. Why is a solid crust or scale often found in kettles and boilers?

7. Why is well-water obtained in towns usually unfit for drinking purposes?

8. How are large towns supplied with good drinking-water?

9. How do fishes obtain the oxygen which they need?

10. Why does a fish soon die if placed in cold water which has been well boiled and not exposed to air?

§ XII. Earth.

1. How do we know that the inside of the earth is hot enough to melt rocks?

2. What is the cause of the "bubbling" when hydrochloric acid is poured onto chalk?

3. How can you show that the bottle in experiment 29 becomes filled with carbonic acid gas?

4. How can chalk be converted into quicklime?

5. Explain why chalk is called a chemical compound.

§ XIII. Earth.

1. Describe an experiment, and sketch the apparatus employed for the preparation of oxygen from red mercury oxide.

2. Why is this red powder called oxide of mercury, or mercuric oxide?

3. If you had 216 ounces of mercury oxide, how many ounces of mercury and of oxygen could you obtain, provided, of course, nothing was lost in the operation?

4. What is meant by oxidation? Give some familiar examples of oxidation.

5. State how you would prove experimentally that iron becomes heavier by rusting.

6. Name several experiments to show that metals are contained in many earthy substances.

7. How can you get metallic lead from white "sugar of

§ XIV. Earth.

1. Where is coal found, and how is it got?

2. How do you know that plants have been buried where the coal is found?

3. Why do you conclude that coal contains carbon and hydrogen?

4. How can you make coal-gas in a tobacco-pipe?

5. How is coal-gas made on the large scale, how collected, and how distributed throughout the town?

6. What is left behind in the tobacco-pipe or "retort" after the coal-gas has come off?

7. Why do some kinds of coal yield more gas than other kinds?

8. What else besides gas is given off in the distillation of coal?

9. Write a short essay on the uses of coal.

§ XV. Earth.

1. Why does the flame of hydrogen emit no light, whilst that of coal-gas is luminous?

2. Look at a candle-flame, and make a drawing of the several parts.

3. In what respects is the burning candle like a gas-works?

4. How can you show that the dark cone inside a candle-flame is filled with unburnt gas?

5. What causes the dreadful explosions in coal-pits?

6. Explain the principles upon which Davy's safety-lamp is based.

7. Draw a picture of a Davy lamp.

§ XVI. Elements and Compounds.

1. Define and explain the terms, "Simple Bodies" or "Elements," and "Compound Bodies." Give examples of each class of substances.

2. How many elementary bodies do we know of?

3. Write down the names of the more important elements, dividing them into metals and non-metals.

4. Do those elements which most closely resemble one another or those which show the greatest difference most readily combine together?

§ XVII. Non-Metallic Elements.

1. Mention the chief properties of oxygen gas.
2. How can it be readily obtained?
3. How would you show that the substances formed when sulphur and phosphorus burn in oxygen are acids?
4. Does hydrogen exist in the free state in the air?
5. How can you show that hydrogen is lighter than air?
6. Three jars containing colourless gases are given to you; how will you tell which jar contains oxygen, which air, and which hydrogen?
7. How can you obtain nitrogen from the air?
8. Name some compounds containing nitrogen.
9. How is nitric acid prepared? What are its properties?
10. Explain the words acid, alkali, and salt.
11. If the alkali potash is mixed with nitric acid, what is formed?
12. How can you prove that diamond is carbon?
13. By what experiment can you show that white sugar contains black carbon?
14. What would be one result if the element carbon had not existed on the earth?

§ XVIII. Non-Metallic Elements.

1. What elements are contained in rock-salt?
2. How can you get chlorine from common salt?
3. Mention the chief properties of the element chlorine.
4. How would you show that white bleaching-powder contains chlorine?
5. What do you notice when a pinch of yellow sulphur is heated in a spoon over a flame?
6. Why is sulphur used for making gunpowder?
7. Name several common substances which contain sulphur.
8. What is the chemical composition of burnt bone?
9. How do you know that phosphorus can exist in two forms? How do these differ?
10. Why is phosphorus used in the manufacture of lucifer matches?
11. Why do the 'safety matches' only light on the box?
12. What is rock crystal made of?
13. How is glass made, and what does it contain?

§ XIX. Metals.

1. Name some of the most important uses of iron.
2. What are the special uses of wrought-iron and of cast-iron?
3. How is cast-iron made, and how does it differ chemically from wrought-iron?
4. What is steel, how is it made, and what are its chief properties?
5. What happens if dilute sulphuric acid is poured upon iron filings?
6. How can you show that green vitriol, or sulphate of iron, is formed in this process?
7. What is the name of the metal contained in clay? Name other substances containing the same metal.
8. What is the chemical composition of (1) quicklime, (2) marble, (3) gypsum, (4) bone earth?
9. How is calcium chloride made?
10. Write down what happens when a solution of calcium chloride is mixed with one of sodium carbonate.
11. What is formed when magnesium ribbon is burnt in the air?
12. How can you get Epsom salts from the white powder got by burning magnesium?

§ XX. Metals.

1. Why must sodium be kept under rock-oil?
2. What happens when sodium is heated in a spoon in the air?
3. Write down a list of some of the sodium compounds, giving their common names, chemical names, and what they contain.
4. Where does rock-salt occur?
5. What happens when we pour sulphuric acid on to common salt?
6. What is the name of the metal contained in the alkali potash?
7. How is soap made? What is the difference between soft and hard soaps?

§ XXI. Metals.

1. What do the common "ores" of copper contain? Name some of the uses of copper.
2. How can copper nitrate be obtained? what is its colour?
3. What happens when copper is heated in the air?
4. What is the name of the common ore of zinc?

5. What is zinc used for? What is its colour, and that of its salts?

6. How can crystals of zinc sulphate be obtained?

7. What is tin used for?

8. What is a blowpipe? How could you get a globule of tin from some of the powdered earthy tin-ore?

9. Where is lead-ore found, and what is its name and composition?

10. What is lead used for?

11. Name some of the useful compounds of lead?

12. What is the chemical name of white-lead, red-lead, and black-lead?

13. How does mercury differ from all the other metals? Why is it called quicksilver?

14. How can you prove that a sixpence contains both silver and copper?

15. What great advantage has gold over silver in its use as an ornament?

§ XXII. Results.

1. How many ounces of water, at least, must I take to get 2 ounces of hydrogen?

2. If I heat 216 ounces of oxide of mercury, what is the largest possible quantity of (1) mercury, and of (2) oxygen, which I can get?

3. What is the combining weight of oxygen, and what that of mercury?

4. Write down the chemical formulæ for (1) mercury oxide, (2) lime, (3) water, (4) sulphuric acid, (5) nitric acid.

5. N meaning 14, and O meaning 16, write down the formulæ of the five oxides of nitrogen with which we are acquainted, giving their composition by weight.

6. Write down the chemical equation representing the changes which take place when sulphuric acid acts on nitre.

7. If I want 63 lbs. of nitric acid, what is the least quantity of sulphuric acid and nitre which I must employ?

8. Show by an equation that if I take 65 lbs. of zinc and 98 lbs. of sulphuric acid I must always get 2 lbs. of hydrogen to 161 lbs. of zinc sulphate if I lose none.

9. Calculate the percentage composition of H_2O, HNO_3, H_2SO_4, KNO_3, $KHSO_4$.

THE END.

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